



8BK20型
装有可移开式断路器的开关装置
额定电压 7.2~12kV
8BK20
With Withdrawable Circuit-Breakers
Switchgear up to 12kV

中压开关装置
Medium-Voltage
Switchgear

SIEMENS

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中压开关装置

Medium-Voltage Switchgear

8BK20 型 7.2-12kV 装有可移开
式断路器的开关装置

Type 8BK20 Switchgear up to
12kV With Withdrawable
Circuit-Breakers

空气绝缘, 金属封闭,
金属铠装, 单/双母线
Air-Insulated, Metal-Enclosed,
Metal-Clad, Single/Duplicate
Busbar

典型用途 Typical uses

8BK20 型装有可移开式断路器的开关装置 8BK20 switchgear with withdrawable circuit-breakers

户内用 8BK20 型可移开式断路器开关装置适用于:

- 额定电压从 7.2kV 至 12kV
- 额定短路开断电流最大至 50kA
- 馈线及母线额定电流至 4000A

8BK20 switchgear for indoor installation with withdrawable circuit-breaker is suitable for:

- Rated voltages from 7.2 kV to 12kV
- Rated short circuit breaking currents up to 50kA
- Feeder and busbar rated currents up to 4000 A

8BK20 型开关装置应用在下列典型场所:

- 发电厂、变电站以及供电系统的配电所
- 水泥工业
- 汽车工业
- 钢铁厂
- 轧钢厂
- 矿山
- 食品及化纤工业
- 化工
- 石油工业
- 管道工程
- 海湾石油装置
- 电化学工业
- 石油化工
- 铁路系统的供电
- 造船工业
- 柴油发电机电站
- 应急发电装置

8BK20 switchgear is used in the following typical areas:

- Power stations, transformer stations and switching substations of public utilities
- Cement industry
- Automotive industry
- Iron and steel works
- Rolling mills
- Mines
- Food and fibre industry
- Chemical industry
- Oil industry
- Pipelines
- Offshore installations
- Electrochemicals
- Petrochemicals
- Railway power supplies
- Ship building
- Diesel power stations
- Emergency power supplies



特征介绍 Features

人身安全

门关闭后才可操作断路器

由于下述原因，更加确保了人身安全

- 断路器的分、合操作：
 - 在断开位置或工作位置上
 - 手动或电动
 - 门总是关闭着的
- 在门关闭时，用手动或电动机驱动可移开部分，将之与母线隔离
- 根据 VDE0105 第一部分，有二种方法可供选择，检验是否带电：
 - 门关闭时，用容性电压带电显示器检测相间电压（参阅第29页）
 - 用通常的符合VDE0681，第4部分的电压测试器测量相间电压，但门须打开。
- 门关闭时，合分接地开关：
 - 馈电柜：手动或电动机驱动
 - 母排：手动

门及可移开部分的联锁

- 只有当可移开部分锁在断开位置上时，门才能打开。
- 只有在门关闭以后，可移开部分才能从断开位置移动到工作位置

防止触电以及阻止外部物体进入

8BK20开关装置提供了内部及外部的双重保护

- 外部保护由下述方法提供：
 - 在各种运行状态下，开关柜完全封闭
- 内部保护由下述方法提供：
 - 内部各室均用金属板隔开并使用加强型的活门。
 - 由小室隔开，任选抗电弧的方式防护等级

标准方式 IP4X/IP40

更高程度的防护如 IP41 IP50及IP51
可以用增加措施的办法来获得

经过抗弧试验的钢板箱体和隔室

8BK20开关装置已根据相关标准作过抗弧试验以保证：

- 外部保护（人身安全）

操作方法

移动柜内的可移开部分

采用下述辅助措施，可用手或电动机很轻便地驱动柜内的可移开部分：

- 丝杠
- 装有滚动轴承的导轨

在开关柜外搬运可移开部分

在开关柜外，也可很容易、轻松地搬运可移开部分

- 使用维护小车（见第6页）
- 只需1人
- 无需其它工具
- 对地面的平整度无要求

搬运可移开部分的操作程序

- 将可移开部分退至断开位置
- 打开柜门
- 拔下低压插头
- 解除可移开部分的联锁（如果不慎移动可移开部分，则被一个附加的联锁装置所阻止）
- 摇高搬运小车，并将之扣在开关柜上（前述的附加联锁自动解锁）
- 将可移开部分推到小车上，并尽量使之靠近车身支架。（不能使它落下来）
- 将维护小车和可移开部分从开关柜上分离开。

遥控

在中央控制室，可进行下述遥控操作：

- 将有电动机推进装置的可移开部分送入工作位置或退至断开位置。
- 分、合断路器
- 电动机操作接地开关将馈电柜接地、短路。

同时仍永远能进行柜前控制操作

设备的可靠性

开关装置的联锁

所有联锁装置都是机械式的，这种用钥匙控制的联锁可防止误操作，即：

- 曲柄只有在各项联锁条件满足时才能插入孔内
- 这样可以避免用力过猛损伤联锁机构。

电气强度

8BK20开关装置足够的电气强度是由下述措施确保的：

- 相与相以及相对地之间有足够的空气间隙。
- 合理的电极形状

这种设计特点允许所有的母排无需再使用其它的绝缘材料。

最大限度地不受气候及周围环境的影响

这是由于下述原因

- 有人爬距裙边的绝缘子及树脂浇注绝缘套管，对污染具有很强的抵抗力。
- 在所有操作中，整个装置都处于封闭状态；

维护

最少的维护工作量是由下述原因取得保证的：

- 所有操作都是在开关装置处于全封闭状态下进行的；
- 应用考核过的真空开关设备和无需维护的断路器以及很少维护的操作机构。

通用性

在扩充开关装置或维修时，可方便地采用下列部件：

- 标准绝缘子
- 标准互感器
- 标准真空开关装置
- 标准铜构件

Personnel safety

Switching operations with door closed

Personnel safety increased by:

- Opening and closing of the switching device;
- In the disconnected or connected position
- Mechanically or electrically
- With the door closed.
- Isolation by moving the withdrawable section, manually or motorized, with the door closed.
- Verification of safe isolation from supply. According to DIN VDE 0105.
- Part 1, there are two alternative methods:
- Pole-by-pole testing with a capacitive voltage detector (see also page 29 with the door closed)
- Testing with conventional voltage testers to DIN VDE 0681, Part 4, but with the door open
- Opening and closing of the earthing switch, optionally make-proof, with the door closed:
- Feeder: manual or motorized
- Busbar: manual.

Interlocking of door/withdrawable section

The door is incorporated in the interlocking concepts as follows:

- Opening is possible only when the withdrawable section is locked in the disconnected position.
- The withdrawable section can be moved from the disconnected to the service position only when the door is closed.

Protection against electric shock and ingress of foreign bodies

8BK20 switchgear provides both external and internal protection.

- External protection is provided by:
 - Complete enclosure of the panels in all operating states.
- Internal protection is provided by:
 - Internal metal compartmentalization with enforced-operation shutters.
 - The inter-cubicle partitions: optional arc-resistant version.
- Degree of protection
- Standard version IP4X/IP40
- Higher degrees of protection, such as IP 41, IP50 and IP 51 can be obtained by additional measures.

Arc-tested sheet-steel enclosure or compartmentalization

8BK20 switchgear has been tested according to the relevant standards for resistance to accidental arcing to ensure:

- External protection (personnel safety)

Operation

Moving a withdrawable section inside a panel

Little effort is required by hand or motor to move a withdrawable section inside a panel with the aid of:

- A spindle mechanism
- Ball-bearing rollers.

Moving a withdrawable section outside a panel

A withdrawable section is light and easy to move outside a panel:

- With a central service truck (see also page 6)
- By one person
- Without tools
- Regardless of floor surface.

Sequence for removing the withdrawable section

- Move the withdrawable section into the disconnected position
- Open the door
- Unplug the low voltage connector
- Unlock the withdrawable section (unintentional removal of the withdrawable section is prevented by an additional interlock)
- Bring up the central service truck and lock it onto the panel (additional interlock is then overridden)
- Pull out the withdrawable section onto the truck as far as it will go (it cannot fall)
- Detach the central service truck and withdrawable section from the panel.

Remote control

Electric remote control, e.g. from a central control room, can be provided for the following functions:

- Moving a motorized withdrawable section into the disconnected or connected position
 - Opening and closing of the switching device
 - Feeder earthing and short-circuiting with motor-operated earthing switch
- There is also always local manual operation for all functions.

Equipment reliability

Switchgear interlocking

All interlocks are mechanical with preventive, key-operated access shutters, i.e.

- Operating lever can only be inserted when the interlocking conditions are fulfilled
- This prevents overstraining of the interlocking mechanisms.

Electric strength

Adequate electric strength of 8BK20 switchgear is assured by:

- Sufficiently large air gaps between phases and to earth
- Suitable electrode form.

These design features allow all conductor insulation to be dispensed with entirely.

Highest level of independence of climate and environment

This is provided by:

- Ribbed insulators and bushings in cast resin, with high resistance to pollution
- Total enclosure under all operation conditions.

Maintenance

Minimal maintenance effort is assured by:

- Total enclosure under all operating conditions
- use of proven, maintenance free vacuum switching devices

Availability

Easy procurement or parts for extensions and repairs through the use of:

- Standard insulators
- Standard instrument transformers
- Standard vacuum switching devices
- Standard copper sections.

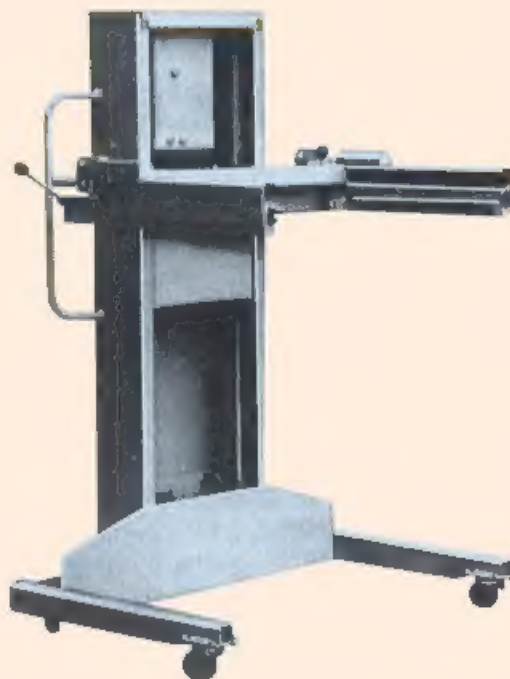
特征介绍 Features

维护小车

- 可移开部分能够降低到地面
- 不能折叠
- 可移开部分能够自动锁到小车上
- 提升臂可以摇到的最大高度为 1200 mm
- 直径大而且可导向的轮子
- 适合于所有的可移开部分

Central service truck

- Withdrawable section can be lowered to the floor
- Non-collapsible
- Withdrawable section locks automatically onto the truck
- Lifting arms can be cranked up to various maximum heights 1200mm.
- Large, swivelling wheels
- Suitable for all withdrawable sections.



待用状态 Ready to use

维护小车 Central service truck

电气数据

可移开式真空断路器柜

隔离排连接柜

母线分段柜

铜排连接柜, I 型

铜排连接柜, II 型

电缆连接柜

Electrical data

Withdrawable vacuum circuit-

breaker panel

Disconnector-link panel

Sectionalizer panel

Busbar connection panel, type I

Busbar connection panel, type II

Cable connection panel

名称 Designation		额定电压, 绝缘等级 Rated voltage, insulation	
		7.2kV List 2	12kV List 2
宽度 Width	mm	800	800
额定工频耐受电压 Rated power-frequency withstand voltage	最大 max.kV	20,32*	28,42*
额定雷电冲击耐受电压 Rated lightning impulse withstand voltage	最大 max.kV	80	75
额定短路开断电流 Rated short-circuit breaking current	最大 max.kA	50	50
额定热稳定电流 Rated short-time current, 3s**	最大 max.kA	50	50
额定短路关合电流/额定峰值电流 Rated short-circuit making current/rated peak current	最大 max.kA	125	125
额定母线电流 Rated current of busbars	最大 max.A	4000	4000
开关柜额定电流 Rated current feeders	最大 max.A	4000	4000

注: *用于中国电力系统,** 25—40kA 达 4s.

Note: * For Chinese Power System, ** 4s for 25-40kA

技术数据 Technical Data

电气数据 Electrical data

可移开式真空接触器柜

Withdrawable vacuum contactor panel

名称 Designation		额定电压, 绝缘等级 Rated voltage, insulation	
		7.2kV List 2	12kV List 2
宽度 Width	mm	800	800
额定工频耐受电压 Rated power-frequency withstand voltage	最大 max.kV	20,32*	42
额定雷电冲击耐受电压 Rated lightning impulse withstand voltage	最大 max.kV	60	75
额定热稳定电流 Rated short-time current	最大 1s max.kA	50 ²⁾	50 ²⁾
	最大 4s max.kA	40 ³⁾	40 ²⁾
额定短路关合电流/ 额定峰值电流 Rated short-circuit making current/rated peak current	最大 max.kA	100	100
额定母线电流 Rated current of busbars	最大 max.A	4000	4000
馈电柜额定电流 Rated current of feeders	最大 max.A	400	400
高压限流熔断器长度 Dimension HVHRC fuses	mm	292	292

测量柜

Metering panel

名称 Designation		额定电压, 绝缘等级 Rated voltage, insulation	
		7.2kV List 2	12kV List 2
宽度 Width	mm	800	800
额定工频耐受电压 Rated power-frequency withstand voltage	最大 max.kV	20,32*	28,42*
额定雷电冲击耐受电压 Rated lightning impulse withstand voltage	最大 max.kV	60	75
额定热稳定电流 Rated short-time current **	最大 3s max.kA	50	50
额定峰值电流 Rated peak current	最大 max.kA	125	125
额定母线电流 Rated current of busbars	最大 max.A	4000	4000

注: *用于中国电力系统, ** 25-40kA 达 4s.

Note: * For Chinese Power System, ** 4s for 25-40kA

电气数据、尺寸 接地变压器柜

Electrical data, dimensions Earthing transformer panel

名称 Designation		额定电压, 绝缘等级 Rated voltage, insulation	
		7.2kV List 2	12kV List 2
宽度 Width	mm	800	800
额定工频耐受电压 Rated power-frequency withstand voltage	最大 max.kV	32	42
额定雷电冲击耐受电压 Rated lightning impulse withstand voltage	最大 max.kV	60	75
额定热稳定电流 Rated short-time current **	最大 3s max.kA	50	50
额定短路关合电流/额定峰值电流 Rated short-circuit making current/rated peak current	最大 max.kA	125	125
额定母线电流 Rated current of busbars	最大 max.A	4000	4000

柜体尺寸

Panel dimensions

名称 Designation		额定电压, 绝缘等级 Rated voltage, insulation	
		7.2kV List 2	12kV List 2
宽度 Width	mm	800	800
高度 Height	mm	2050	2050
电缆直接连接到母排时的高度 Height with cable connection to the busbars	mm	2550	2550
带符合 PEHLA 标准 1-6, 历时1秒钟 故障电弧有倾斜板时的高度	20kA mm	2050	2050
Height with deflecting plate fitted to comply with PEHLA criteria 1-6, for 1s fault arc duration:	≥ 25kA mm	2450	2450
单母线柜深度 Depth of single busbar panel	mm	1850	1850
从前面接线, 靠墙安装 Connection at front, wall mounting ¹⁾			
从前面接线, 靠墙安装或单独竖立 Connection at front, wall mounting or free standing ¹⁾	mm	1775	1775
从后面接线, 单独竖立 Connection at rear, free standing ¹⁾	mm	1775	1775
双母线柜, 背靠背布置 Duplicate busbar panel in back-to-back arrangement	mm	3580 ²⁾	3580 ²⁾

- 1) 参阅第 30 页开关柜的接线方式说明
2) 对额定短路开断电流为 50kA 的深度为: 3980mm
1) See also under Panel connection, page 30
2) Depth 3980mm for rated short-circuit breaking
current 50kA

技术数据 Technical Data

尺寸

低压室内部可利用
的空间尺寸

**Usable internal dimensions of
the low-voltage compartment**

低压室型式 Version of low-voltage compartment				额定电压, 绝缘等级 Rated voltage, insulation	
				7.2kV List 2	12kV List 2
宽度 Width		mm		800	800
标准型 Standard compartment	宽 Width	mm		680	680
	高 Height	mm		680	680
	深 Depth	mm		450	450
附加顶箱 Additional top box	宽 Width	mm		680	680
	高 Height	mm		400	400
	深 Depth	mm		420	420

高压电缆室内部可利用的高度
从电缆夹持架至底板开孔中心
之间的距离

**Usable internal height for
high-voltage cables**

Distance between centres of lug hole
and cable clamp support rail

内部高度 Internal height		额定电压, 绝缘等级 Rated voltage, insulation	
		7.2kV	12kV
宽度 Width	mm	800	800
标准型 Standard version			
从前面接线 connection at front	约 approx. mm	425	425
从后面接线 connection at rear	约 approx. mm	600	600
有较深底板的标准型 Standard version with deeper bottom plate			
从前面接线 Connection at front	约 approx. mm	625	625
从后面接线 Connection at rear	约 approx. mm	800	800



安装说明

从前面接线 7.2/12kV 地板开槽及固定点

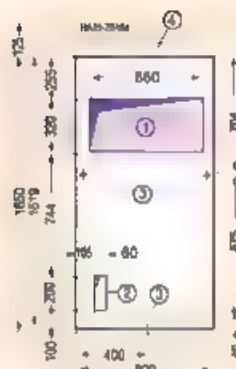
- 适用于单母线
- 适用于双母线面对面布置

Installation details

7.2/12kV, connection at front

Floor cutouts and fixing points

- For single busbars
- For duplicate busbars in face-to-face arrangement



图A

- 对于移开部分的开关柜，可不选④
- 对铜排连接的 I、II 型柜，当其每相最大为 4 根 500mm² 电缆时，也可不用④
- 对于分段柜，为 2X 图 A，但无①，也可不选用④
- 对于测量柜，无①，也可不选用④

Fig. A

for withdrawable panel, optionally without ④
for busbar connection panel,
type I and type II up to 4 × 500mm²
sealing ends¹⁾ per phase,
optionally without ④
for sectionalizer, 2 × Fig. A
but without ①
optionally without ④
for metering panel,
but without ①
optionally without ④



图B

- 用于铜排连接 I 型柜，每相电缆，从 5 根 500mm² 至 12 根 500mm²，也可不选用④

Fig. B

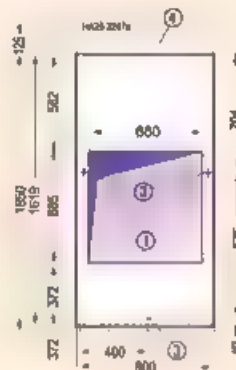
for busbar connection panel
type II, with 5 × 500mm²
up to 12 × 500mm²
sealing ends¹⁾ per phase,
optionally without ④

7.2/12kV 开关设备，从前面接线时地板开槽及固定点位置

Floor cutouts and fixing points for 7.2/12kV switchgear, connection at front

- ① 用于电缆接线的地板开槽(按用户要求，也可以用铜排连接)
- ② 控制电缆用地板开槽
- ③ 固定点(25×45mm槽)与柜体前面平行
- ④ 装在背面的电缆室压力释放通道(额定短路开断电流 50kA 的开关柜是必需的)
- 1) 参阅西门子公司通常采用的交联聚乙烯单芯密封电缆头或类似尺寸的其它产品。

- ① Floor cutout for high-voltage cables (bus connections on request)
- ② Floor cutout for control cables
- ③ Fixing point (25 × 45mm slot) parallel to panel front
- ④ Rear-mounted pressure relief duct of connection compartment (always necessary for rated short-circuit breaking current 50kA)
- 1) The data refer to Siemens conventional single-core sealing ends for XLPE cables for other makes with similar dimensions



图C

用于电缆连接柜可不选④

Fig. C

for cable connection panel
optionally without ④

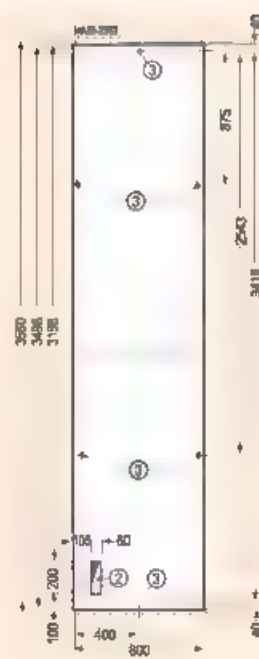
7.2/12kV 开关设备，从前面接线时地板开槽及固定点位置

Floor cutouts and fixing points for 7.2/12kV switchgear, connection at front

- 用于双母线线背靠背布置

Floor cutouts and fixing points

- For duplicate busbars in back-to-back arrangement



用于分段柜、测量柜及母线连接的开关柜应采用图A
主母线线的正反面应紧一铜C

用下母线耦合时:

Fig.D
for sectionalizer,
metering and busbar connection
panels Fig.A should be used
for cable connection panels Fig.C

Fig.E
for bus coupler

从而直接线的7.2/12kV开关装置地板开槽及固定点位置

Floor cutouts and fixing points for 7.2/12kV switchgear connection at front

- 从后面接线¹⁾的 7.2/12kV 开关装置地板开槽及固定点

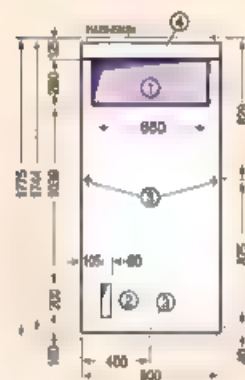
- 用卡扣固定
 - 凡与电源线接触面布置
- ① 高压电缆连接时的地板开槽(根据用户要求,也可用铜排连接)
 - ② 控制电缆用地板开槽
 - ③ 固定点(25×45mm 槽)与柜体前面平行
 - ④ 安装在背后的电缆与柜体背面通道

1. 網之電路，斷一而為50kA時，其按戶戶口要

7.2/12kV,connection at rear)

Floor cutouts and fixing points

- For single busbars
- For duplicate busbars in face-to-face arrangement
- Floor cutout for high-voltage cables (bus connections on request)
- ② Floor cutout for control cables
- ③ Fixing point (25 x 45mm slot) parallel to panel front
- Rear-mounted pressure relief duct of connection compartment
- 1) For rated short-circuit breaking current 50kA on request.



用于分段和2X1图P, 但无①
用于陶磁板, 但无①

for withdrawable panel with 4
for sectionalizer, 2X Fig.F
but without ①
for metering panel, but without ①

7.2 /12kV 开关设备, 从后面接线时地板开槽及固定点位置

Floor cutouts and fixing points for 7.2/12kV switchgear, connection at rear



安装说明

关于开关室的设计资料

应该参照附表及第12页的图样来规划开关装置室的布置

- 单母线单排或面对面布置(图A或B)或
- 双母线面对面布置(图B)

Installation details

Planning the layout

The data given in the following tables and the figures on page 12 should be used for planning the layout of the switchgear room

- Single busbars on single-row or face-to-face arrangement (Fig A or B) or
- Duplicate busbars in face-to-face arrangement (Fig B)

- 双母线背靠背布置(图C)

- Duplicate busbars in back-to-back arrangement (Fig C)

地板承受的负荷

Floor loading

固定方法

开关装置可用下述方法紧固:

- 用螺栓固定到基础轨道上
 - 焊接在基础轨道上
 - 基础轨道的位置由开关柜底座上固定点的位置来决定(参阅第11-12页)
 - 更详细的说明, 参见使用说明书
- 1) 也可参阅第30页开关柜的接线方式
- 2) 对7.2/12kV额定短路开断电流为50kA的开关柜, 只能从前面接线, 后面安装压力通道。开关装置与后墙之间的距离至少要有500mm。在此距离情况下, 必须安装盖板。

电动机室的 压力通道 Pressure relief ¹⁾ of connection compartment	安装在背 后的压力通道 Rear-mounted ¹⁾ pressure relief duct	布置 ²⁾ Arrangement ²⁾	尺寸 Dimension				
			a	b	c	d	e

7.2/12kV, 从前面接线

7.2/12kV, connection at front

向下 Downwards	无 Without	靠墙 WALL	≥ 1100	33	1620	50	≥ 1300
到后面 To rear	无 Without	靠墙 WALL	≥ 1100	33	1620	150	≥ 1300
向上 Upwards	有 With	靠墙/单独站立 Wall/Free-stand	≥ 1100	33	1745 ²⁾	min.50 ¹⁾	≥ 1300

7.2/12kV, 从后面接线

7.2/12kV, connection at rear

向上 Upwards	有 With	单独站立 Free-standing	≥ 1100	33	1745	min.500	≥ 1300
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电动机室的 压力通道 Pressure relief ¹⁾ of connection compartment	安装在背后 ¹⁾ 的压力通道 Rear-mounted ¹⁾ pressure relief duct	布置 ²⁾ Arrangement ²⁾	尺寸 Dimension				
			a	b	c	d	e

7.2/12kV, 从前面接线

7.2/12kV, connection at front

向上 Upwards	有 With	单独站立 Free-standing	≥ 1100	33	1620	—	—
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开关柜 Panel	单母线或双母线柜面对面布置时的重量 Single busbar panels or duplicate busbar panels in face-to-face arrangement Weight of individual panels	双母线柜背靠背布置并装有两个断路器的重量 Duplicate busbar panels in back-to-back arrangement equipped with two circuit-breakers Weight
7.2/12kV	约重 approx 700-1200kg	约重 approx 1400-2000kg

Fixing

The switchgear can be fixed by

- Bolting to the foundation rails
- Welding to the foundation rails
- The position of the foundation rails is governed by the fixing points in the panel base frames (see page 11 to 12)
- Further details are given in the operating instructions.

1) See also under Panel connection, page 30

2) For switchgear with rated short-circuit breaking current 50 kA at 7.2/12kV only connection at front and with rear mounted pressure relief duct is feasible.

Rear distance between switchgear and wall must be 500mm at least

For this rear distance, cover plates must be provided

关于开关室的设计资料

下面各图以及第 13 及 14 页表格中提供的数据，
可用作开关室的设计资料

Planning the layout

The data given in the following figures and
the tables on page 13 and 14 should be used
for planning the layout of the switchgear room.

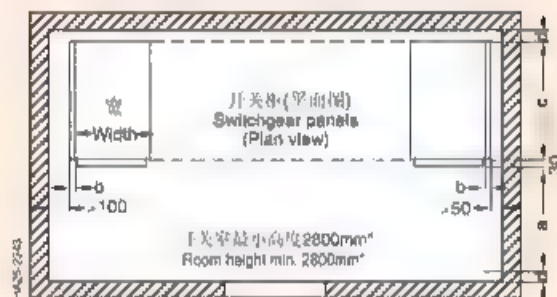


图 A 单排布置
Fig. A Single-row arrangement

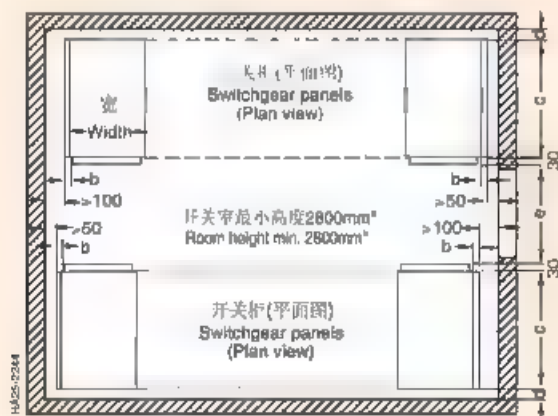


图 B 面对面布置
Fig. B Face-to-face arrangement

- 1) 如室内高度较低，请咨询
- 2) 额定短路开断电流为 50kA 时，660 mm
- 3) 在开关柜的一端必须有一条 1200mm 宽的通道，以便将可移开部分推入这通道
- 1) Ask for advice if the room height is less
- 2) For rated short-circuit breaking current 50kA, 660mm.
- 3) There must be a 1200mm wide aisle at one end to wheel in the withdrawable section

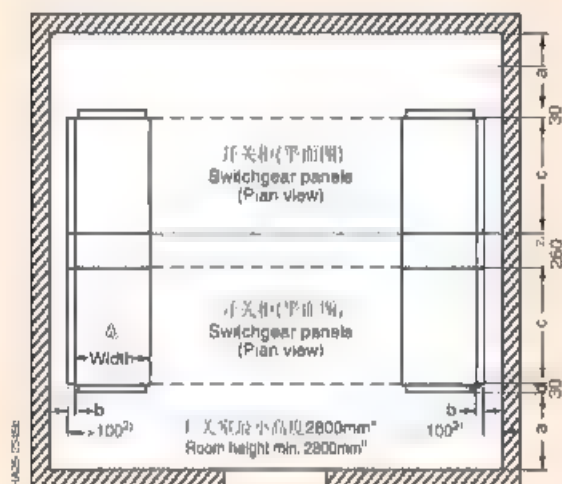


图 C 背靠背布置
Fig. C Back-to-back arrangement



运输说明

运输单元

在决定采用何种尺寸的运输单元时，下述因素应考虑在内：

- 现场运输工具
- 运输重量及尺寸
- 建筑物的通道尺寸

Shipping details

Transport units

The following factors should be taken into account when deciding on the size of transport units to be employed

- Transport facilities on site
- Transport weights and dimensions
- Size of building doorways

运输单元 Transport unit	额定电压及宽度 Rated voltage and width
	7.2/12kV 800mm
单母线柜或面对面布置时的双母线柜中的单台柜 Single busbar panels or single panels of a duplicate busbar installation for face-to-face arrangement	最多3台柜 max. 3 panels
背靠背双母线柜 Duplicate busbar panels for back-to-back arrangement	最多2台柜 max. 2 double panels

包装

Packing

到达地 Destination	运输方法 Transport by	包装型式 Type of packing
中国 China	铁路及公路 Road and rail	开关柜放在木质底盘上，用聚乙烯薄膜袋罩在产品上。 Panels on pallets and open packing with polyethylene sheets covering the panels
国外 Overseas	海运 Ship	开关柜放在木质底盘上，上部及下部用聚乙烯薄膜密封，与柜成一整体，用木箱板封装，最长储期6个月。 Panels on pallets in sealed crates with upper and lower polyethylene sheets welded together with desiccant bags and sealed wooden floor; max. storage: 6 months

运输说明

运输尺寸及重量

Shipping details

Transport dimensions
and weights

额定电压 Rated voltage Unit	每个运输单元 的开关柜数 Number of panels per transport unit	尺寸、体积及重量 Dimensions volumes and weights				
		宽 Width	深 Depth	高 Height	体积 Volume	总重约 Gross weight approx
		m	m	m	m ³	kg

中国国内包装 China

从前面接线¹⁾ 后面不装有压力释放通道

Connection at front¹⁾ without rear-mounted pressure relief duct

7.2/12kV	1 台柜 1 panel	1.08	1.90	2.25	4.63	770
	2 台柜 2 panels	1.90	1.90	2.25	8.12	1640
	3 台柜 3 panels	2.66	1.90	2.25	11.37	2300

从前面接线¹⁾ 后面装有压力释放通道或从后面接线

Connection at front¹⁾ with rear-mounted pressure relief duct, or connection at rear

7.2/12kV	1 台柜 1 panel	1.08	2.08	2.25	4.96	770
	2 台柜 2 panels	1.90	2.08	2.25	8.90	1630
	3 台柜 3 panels	2.66	2.08	2.25	12.48	2300

背靠背布置²⁾

Back-to-back arrangement²⁾

7.2/12kV	1 台柜 1 panel	1.08	4.00	2.30	9.75	1390
	2 台柜 2 panels	1.90	4.00	2.30	17.48	2780

1) 额定短路开断电流为50kA, 7.2/12kV 开关

装置只有从前面接线和后面装有压力释放通道是可行的, 开关装置后面与墙之间的距离不得少于500mm, 而且必须提供盖板。

2) 当柜内有2台可移开式断路器时净重增加约180kg。额定短路开断电流为50kA的开关装置体积会随之改变, 深度增加0.4m

1) For switchgear with rated short-circuit breaking current 50 kA at 7.2/12kV only connection at front and with rear-mounted pressure relief duct is feasible.

Rear distance between switchgear and wall must be 500 mm at least.

For this rear distance cover plates must be provided.

2) The gross weight increases by about 180kg when there are two withdrawable circuit-breakers in a panel. The depth will be increased to 0.4m for switchgear with rated short-circuit breaking current 50 kA up to 7.2/12kV.
The volume will change accordingly

国外 Overseas

从前面接线¹⁾ 后面不装压力释放通道

Connection at front¹⁾ without rear-mounted pressure relief duct

7.2/12kV	1 台柜 1 panel	1.08	1.90	2.41	4.85	1050
	2 台柜 2 panels	1.90	1.90	2.41	8.65	1880
	3 台柜 3 panels	2.66	1.90	2.41	12.15	2730

从前面接线¹⁾ 后面装有压力释放通道或从后面接线

Connection at front¹⁾ with rear-mounted pressure relief duct, or connection at rear

7.2/12kV	1 台柜 1 panel	1.08	2.08	2.41	5.31	1080
	2 台柜 2 panels	1.90	2.08	2.41	9.47	1930
	3 台柜 3 panels	2.66	2.08	2.41	13.30	2770

背靠背布置²⁾

Back-to-back arrangement²⁾

7.2/12kV	1 对柜 (2台) 1 panel	1.08	4.00	2.46	10.43	1950
	2 对柜 (4台) 2 panels	1.90	4.00	2.46	18.70	3460

Single busbar panels
Withdrawable panel

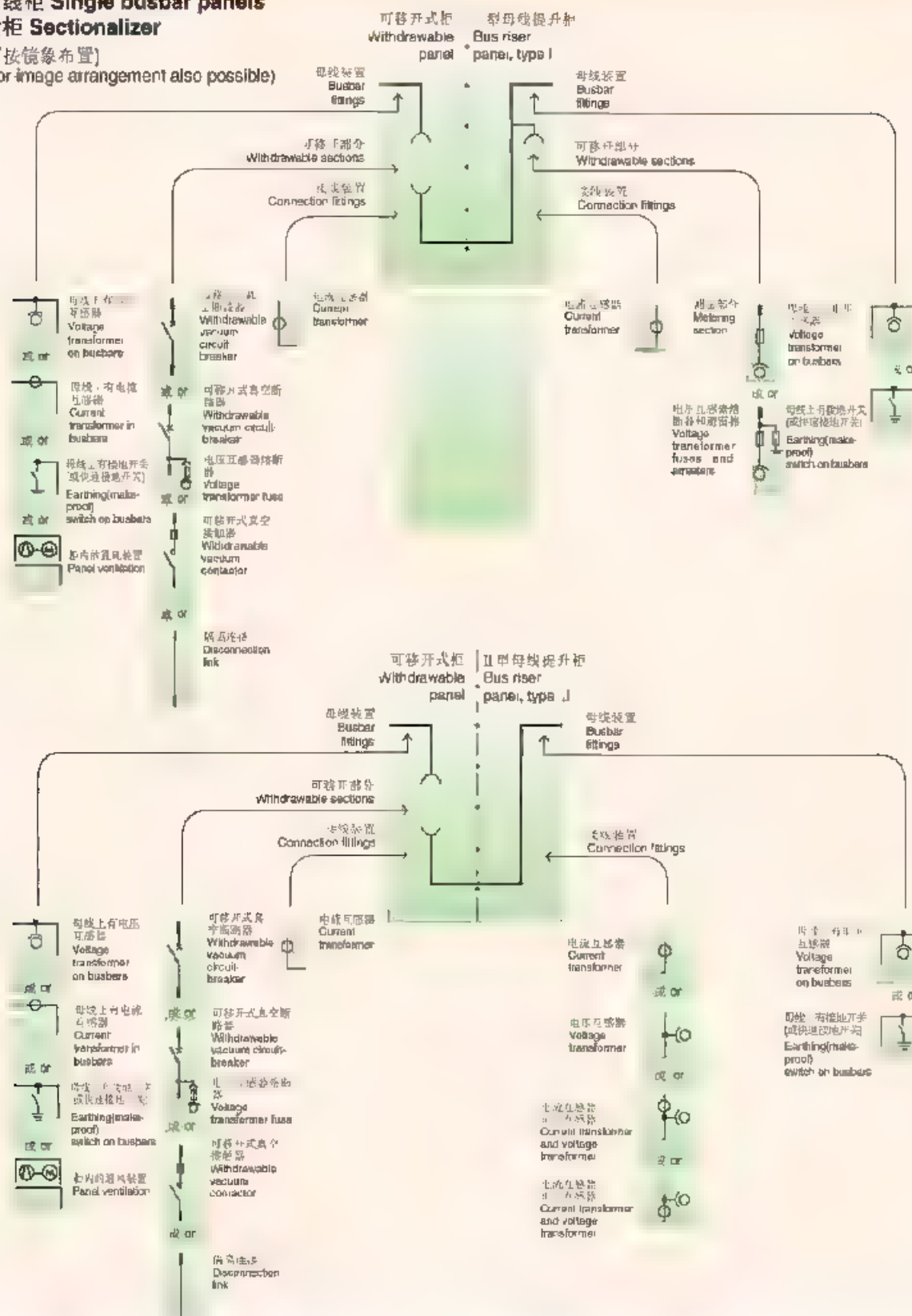


Siemens conventional, single-core sealing ends for XLPE cables or other makes with similar dimensions.

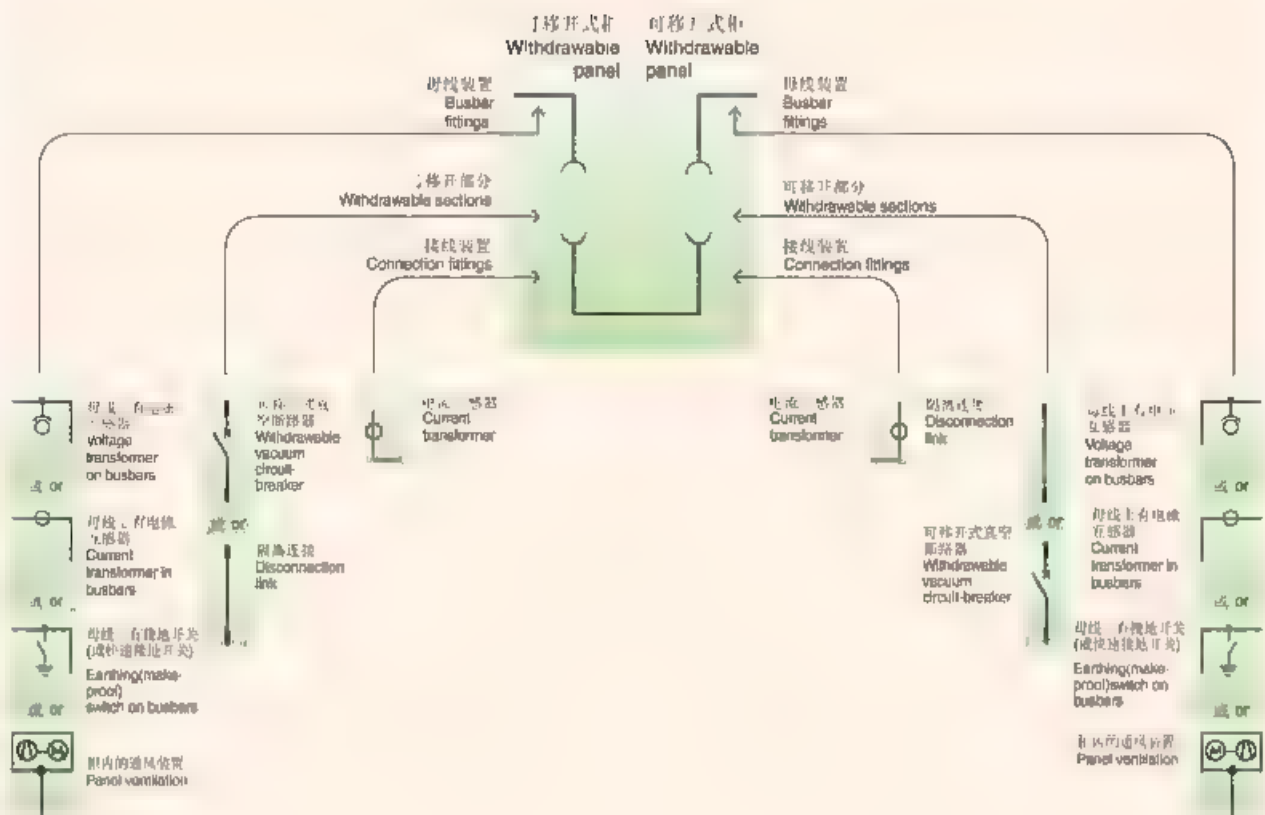
一次方案 Product Range

单母线柜 Single busbar panels 分段柜 Sectionalizer

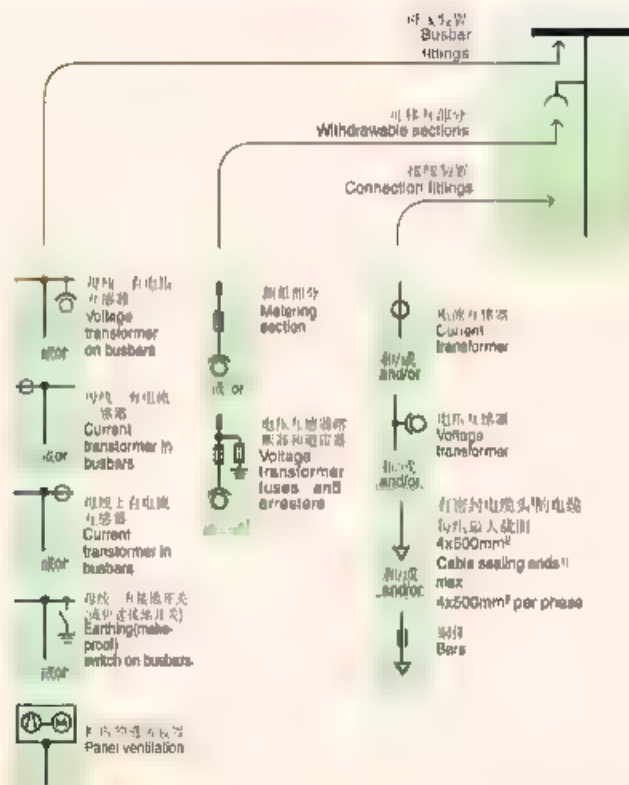
(亦可按镜像布置)
(mirror image arrangement also possible)



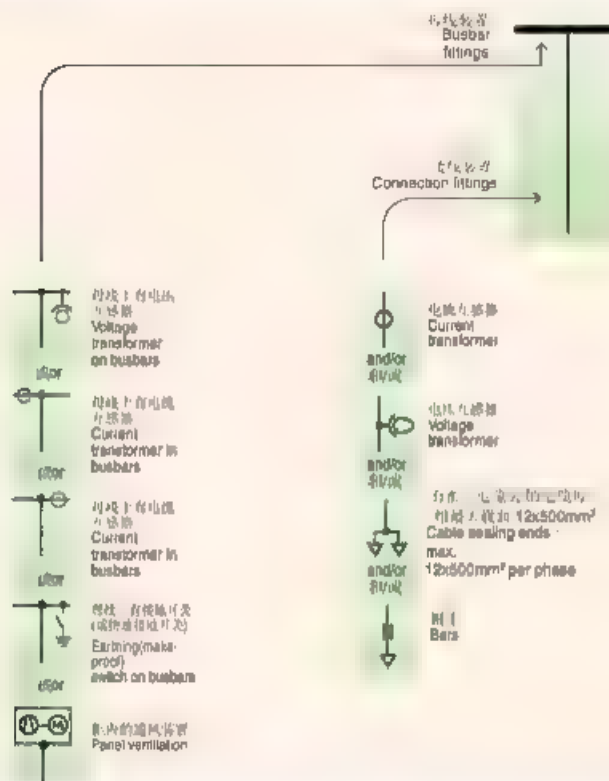
单母线柜
分段柜
Single busbar panels
sectionalizer



Type 1



Type II

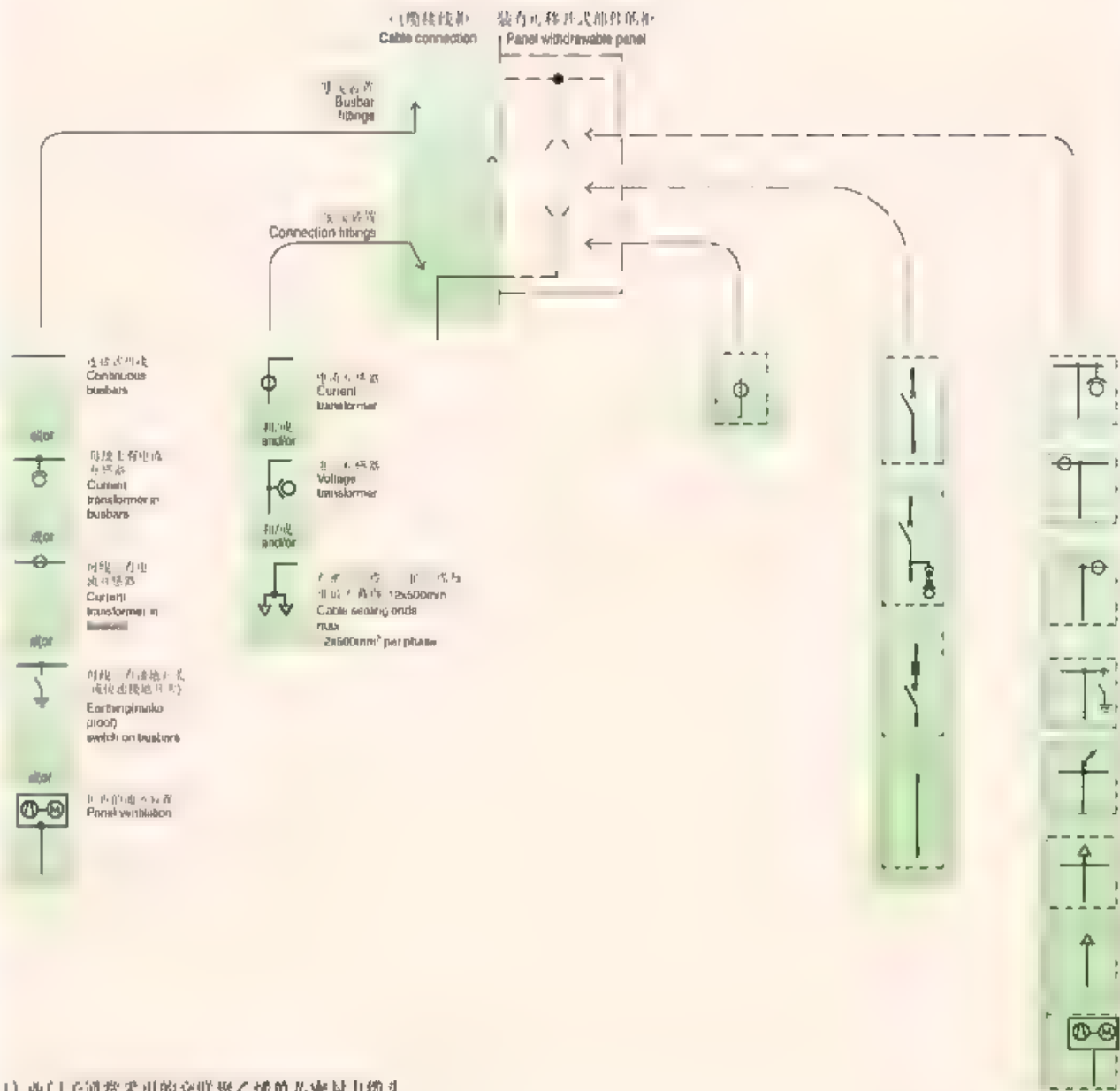


1) 西门子公司通常采用的交联聚乙烯单芯
密封电缆头或类似尺寸的其他产品
Siemens conventional, single-core
sealing ends for XLPE cables or
other makes with similar dimensions

单母线柜
电缆接线柜

Single busbar panels
Cable connection panel

(亦可按镜像布置)
(mirror-image arrangment also possible)



1) 西门子通常采用的交联聚乙烯单芯密封电缆头
或类似尺寸的其他产品

1) Siemens conventional single-core sealing
ends for XLPE cables or other makes with
similar dimensions

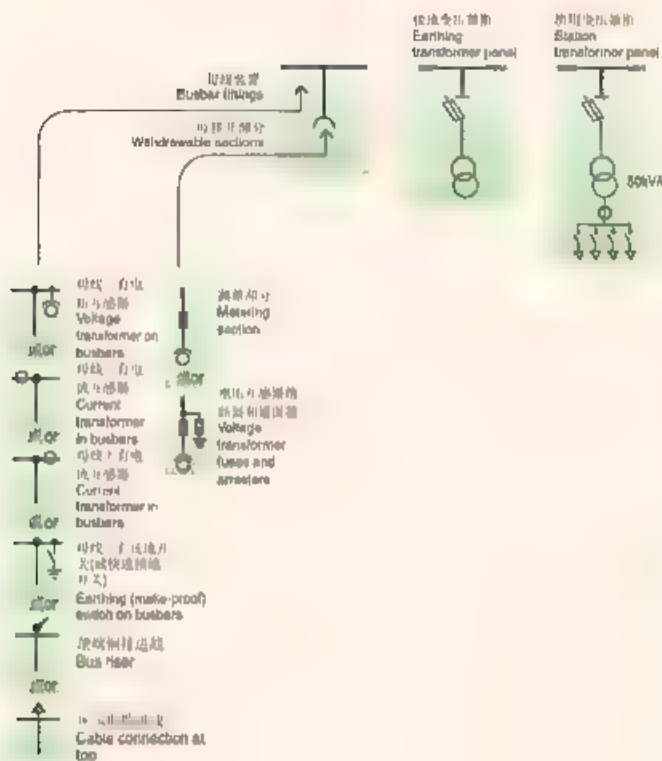
一次方案 Product Range

单母线柜

可移开式测量柜

Single busbar panels

Metering panel, withdrawable type



双母线柜 Duplicate busbar panels

8BK20 双母线开关装置由单母线柜组合而成，它有以下方式：

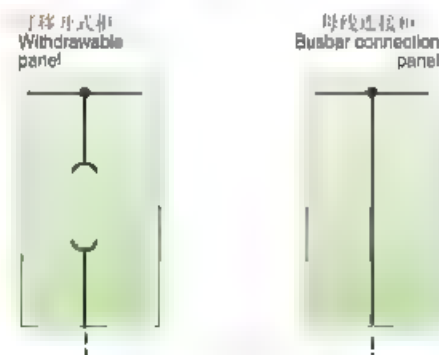
- 面向布置或背对背布置

8BK20 duplicate busbar switchgear is assembled from the range of single busbar panels, they can be arranged either

- Face-to-face or
- Back-to-back

面对面布置 Face-to-face arrangement

- 和的方案，单母线柜相同
- 两排柜由电缆或经中性的铜排连接
- 母线耦合柜包含有可移开式柜和母排连接柜
- Panels from the single busbar product range
- The two rows are linked by cables or bars underneath the panels
- Bus coupling, comprising withdrawable panel and busbar connection panel

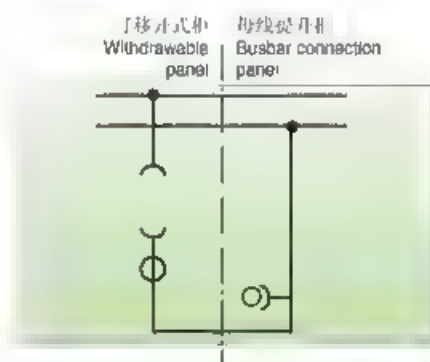


背对背布置

- 和的方案，单母线柜相同
- 两排柜由柜内的铜排连接
- 母线耦合柜包含有：
- 可移开式柜，但仅有电流互感器及一种特殊的母线耦合柜
- 和的方案，有可移开式柜和母排连接柜

Back-to-back arrangement

- Panels from the single busbar product range
- The two rows are linked by bars inside the panels
- Bus coupling, comprising:
- Withdrawable panel, but only with current transformer and a special bus coupling and riser panel
- Fittings on the busbars as for sectionalizing single busbars



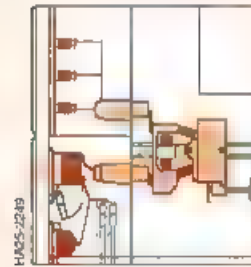
单母线柜

可移开式真空断路器柜

- 用途
用于控制变压器、电动机、电容器、电缆、架空线，还可作为联络柜。
- 特点
 - 用继电器作短路保护
 - 额定短路开断容量最大可达 50kA
 - 额定电流开断能力最大可达 4000A
 - 工作寿命
额定短路开断电流约 100 次，额定电流约 30 000 次
- 电缆接线方式
从前面接线，可选择装在后部的七缆室，并释放通道。
从后面接线，并在后面装有电缆压力释放通道。

Single busbar panels Withdrawable vacuum circuit-breaker panel

- Application
For switching transformers, motors, capacitors, cables, overhead lines and ties.
- Special features
 - Short-circuit protection by relay
 - Max rated short-circuit breaking capacity up to 50kA
 - Max rated breaking capacity up to 4000A
- Operating frequency
Rated short-circuit breaking current up to approx. 100 x I_{sc}
Rated current up to approx. 300,000 x I_n
- Cable connection
at front, optionally with rear-mounted pressure relief duct for connection compartment.
at rear, with rear-mounted pressure relief duct for connection compartment.



7.2/12kV

可移开式真空断路器柜 (剖面图)

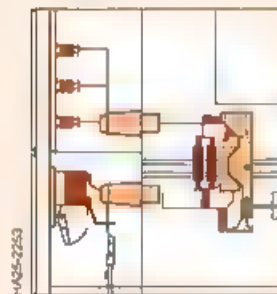
Withdrawable vacuum circuit-breaker panel (sectional view)

电气设计部分 Electrical Design

单母线柜

可移开式真空接触器柜

- 用途
用于控制容量约达 630kVA 变压器，功率约达 1100kW 的电动机以及电容器组
- 特点
 - 高压限流断路器短路保护
 - 额定短路开断容量：同高压限流断路器的开断容量
 - 额定电流可达 400A
 - 工作寿命：开断额定电流可达 100 万次
 - 电缆接线方式¹⁾
从前面接线，接线室选择在后面安装的电缆室压力释放通道，从后面接线，并在后面装有电缆室压力释放通道



7.2/12kV

可移开式真空接触器柜 (剖面图)
Withdrawable vacuum contactor panel (sectional view)

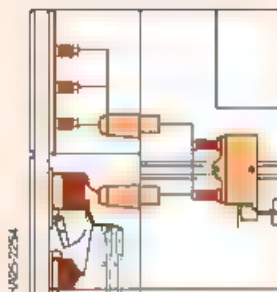
Single busbar panels

Withdrawable vacuum contactor panel

- Application
For switching transformers up to about 630 kVA, motors up to about 1100kW and capacitors.
- Special features
 - Short-circuit protection by HV MRC fuses
 - Rated short-circuit breaking capacity¹⁾ breaking of short-circuit current by HV MRC fuses
 - Rated breaking capacity up to 400A
 - Operating frequency¹⁾
Rated current up to 1 million × 1s
 - Cable connection¹⁾
at front, optionally with rear-mounted pressure relief duct for connection compartment;
at rear, with rear-mounted pressure relief duct for connection compartment.

隔离排连接柜

- 用途
用于将母线连接的部分分离开来
- 特点
 - 短路保护：由主断路器
 - 额定短路开断容量：由主断路器开断短路电流
 - 额定开断容量：无开断容量
 - 工作寿命：机械寿命 1000 次，空载分合
 - 电缆接线方式¹⁾
从前面接线，选择在后面安装的电缆室压力释放通道，从后面接线并在后面装有电缆室压力释放通道



7.2/12kV

隔离排连接柜 (剖面图)
Disconnector-link panel (sectional view)

Disconnector-link panel

- Application
For isolating a connection to the busbar
- Special features
 - Short-circuit protection by master-circuit breaker
 - Rated short-circuit breaking capacity breaking of short-circuit current by master circuit-breaker
 - Rated breaking capacity No breaking capacity
 - Operating frequency¹⁾
Mechanical, 1000 off-load switching cycles
 - Cable connection¹⁾
at front, optionally with rear-mounted pressure relief duct for connection compartment; at rear, with rear-mounted pressure relief duct for connection compartment.

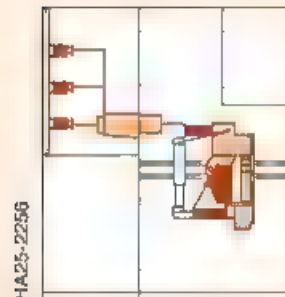
1) 还可参阅第 30 页开关柜的接线方式
1) See also under Panel connection, page 30

单母线柜 可移开式测量柜

- 用途
 - 测量母线电压
 - 将电压互感器与母线隔离开来
 - 将电压互感器初级安装在熔断器
- 特点
 - 只有在可移开部分处于断开位置，母线室被隔离时，才可接触电压互感器
 - 电压互感器二次回路切断
 - 安全保护装置

Single busbar panels Metering panel, withdrawable

- Application
 - Measurement of busbar voltage
 - Isolation of voltage transformers from busbars
 - Primary-side fusing of voltage transformers.
- Special features
 - Access to voltage transformers only possible when withdrawable section in disconnected position, busbar thus compartmentalized
 - Transformer secondary circuits isolated
 - High-voltage compartment door open.



7.2/12kV

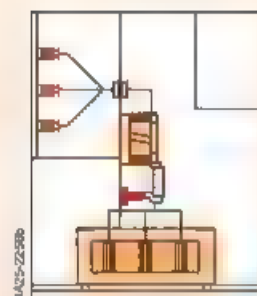
可移开式测量柜 (剖面图)
Metering panel, withdrawable (sectional view)

接地变压器柜

- 用途
 - 为中性点接地系统或经高阻接地运行系统中的发电机提供接地保护装置所需电能
- 接地变压器具有附加的绕组，用于测量电压和综合保护装置
- 特点
 - 短路保护：由熔断器隔离开关中的高压熔断器来承担
 - 额定短路开断容量：按高压限流熔断器
 - 额定开断容量：没有
 - 工作寿命：1000次空载机械操作
 - 只有在熔断器隔离开关处于断开位置，高压室门打开，而在活门关闭后，才可接触接地变压器

Earthing transformer panel

- Application
 - Provision of required power for earth fault protective devices for generators in systems with isolated or high resistance earthed neutral
- Earthing transformer with additional measuring winding for voltage measurements and protective devices
- Special features
 - Short-circuit protection by HV HRC fuses of the fused switch disconnector
 - Rated short-circuit breaking capacity: by HV HRC fuse
 - Rated breaking capacity: No breaking capacity
 - Operating frequency: Mechanical, 1000 off load switching cycles
 - Access to earthing transformer only possible when fused switch disconnector in Off position, high-voltage compartment door open, after that the protective barrier for shielding the busbar voltage must be inserted.



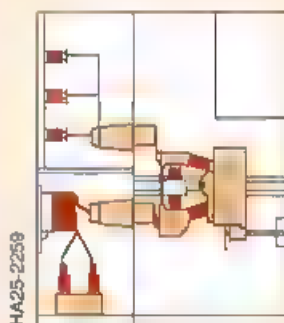
7.2/12kV

接地变压器柜 (剖面图)
Earthing transformer panel (sectional view)

电气设计部分 Electrical Design

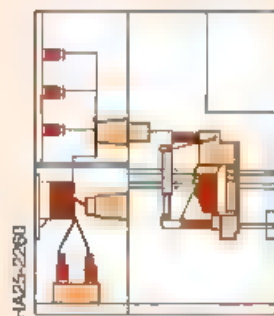
单母线柜 分段柜

- 用途
1. 与线部分出耦合 此的 使用, 真空断路器, 真空 向开关或向高电压
- 特点
- 分段柜包含有一台可移开式柜 (参阅第23 页和第 24 页) 和 一台 I 型或 II 型母线提升柜
- I 型母线提升柜内的可移开部分装有电压互感器, 可选择在其初级侧安装熔断器
只有当可移开部分处于断开位置, 母线被短路, 而且互感器次级回路被短路时, 才可接触电压互感器
- II 型母线提升柜装有固定式电压互感器, 在式初级侧安装熔断器 只有在可移开部分向可移开部分入后, 将之接地, 并打开螺栓紧固的门之后, 才可接触电压互感器
在可移开部分与线部分之间连接铜排可 向可移开部分



7.2/12kV

可移开式柜(剖面图)
Withdrawable panel (sectional view)

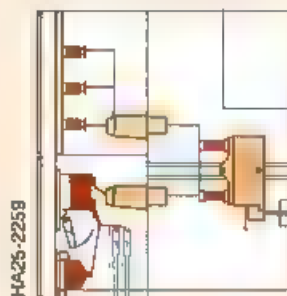


7.2/12kV

I 型母线提升柜(剖面图)
Bus riser panel, type I (sectional view)

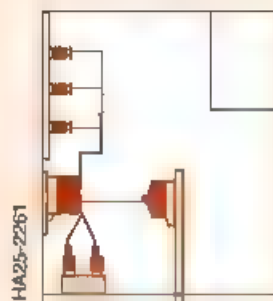
Single busbar panels Sectionalizer

- Application
For coupling busbar sections with either vacuum circuit-breaker vacuum switch or disconnecter link
- Special features
A sectionalizer comprises a withdrawable panel see page 23 and 24 and a bus riser panel type I or II
- Type I bus riser panel with voltage transformers optionally with primary fuses on withdrawable section.
Access to voltage transformers only possible when:
withdrawable section in disconnected position, busbars thus compartmentalized and transformer secondary circuits isolated.
high-voltage compartment door open
- Type II bus riser panel with fixed-mounted voltage transformers, without primary fuses
Access to voltage transformers only possible when:
busbar isolated and earthed by operating personnel.
screw-fixed door opened with tools.
- Connector bars between withdrawable and bus riser panel inside the enclosure



7.2/12kV

可移开式柜(剖面图)
Withdrawable panel (sectional view)



7.2/12kV

II 型母线提升柜(剖面图)
Bus riser panel, type II (sectional view)

单母线柜 母线接线柜

• 用途

直接将电缆或铜排与母线连接

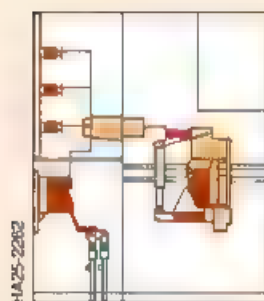
• 特点

- I 型母线接线柜

有电压互感器, 在可移开式断路器部分的电压互感器初级上装有熔断器。从前面进行电缆接线¹⁾ 每相最多可接 4 根 500mm² 截面单芯交联聚乙烯电缆。只有在下列情况下才可接触电压互感器: 可移开部分在断开位置, 母线隔室被隔离封闭, 以及互感器次级回路被断开, 高压室门打开。

- II 型母线接线柜

电压互感器固定安装, 初级无熔断器。从前面进行电缆连接, 每相最多可接 12 根 500mm² 截面单芯交联聚乙烯电缆。只有在上述情况下, 才可接触电压互感器: 母线由操作人员将之隔离并接地, 打开螺栓紧固的门。



7.2/12KV

I 型母线接线柜 (剖面图)

Busbar connection panel, type I (sectional view)

Single busbar panels Busbar connection panels

• Application

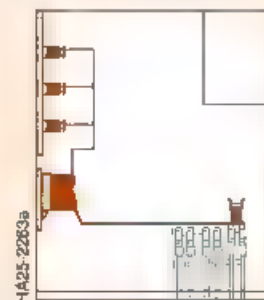
Direct connection of cables or bars to the busbars.

• Special features

- Type I busbar connection panel with voltage transformers with primary fuses on withdrawable metering section.

Cable connection from front: max. 4 x 500mm² single-core XLPE cables per phase¹⁾. Access to voltage transformers only possible when withdrawable section is in disconnected position, busbars thus compartmentalized and transformer secondary circuits isolated. high-voltage compartment door open.

Type II busbar connection panel: with fixed mounted voltage transformers, without primary fuses. Cable connection from front: max. 12 x 500mm² single-core XLPE cables per phase¹⁾. Access to voltage transformer only possible when: busbar isolated and earthed by operating personnel, screw-fixed door opened with tools.



7.2/12KV

II 型母线接线柜 (剖面图)

Busbar connection panel, type II (sectional view)

电缆接线柜

• 用途

当相邻柜之间绝缘母排连接时, 在此种情况下, 应用电缆接线柜。

• 特点

- 当相邻柜之间绝缘母排连接时, 在此种情况下, 应用螺栓紧固。

从螺栓紧固的门, 必须使用工具才可将其打开。

从前面进行电缆连接

Cable connection panels

• Application

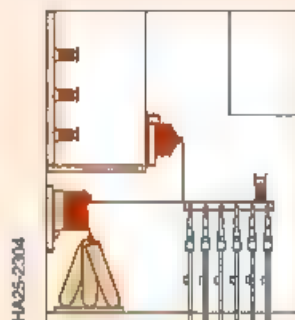
For connecting to an adjacent withdrawable panel inside the enclosure with fully insulated bars

• Special features

For connecting to an adjacent withdrawable panel inside the enclosure with fully insulated bars

Bolted door, removable only with tools

Cable connection from front



7.2/12KV

电缆接线柜 (剖面图)

Cable connection panels (sectional view)

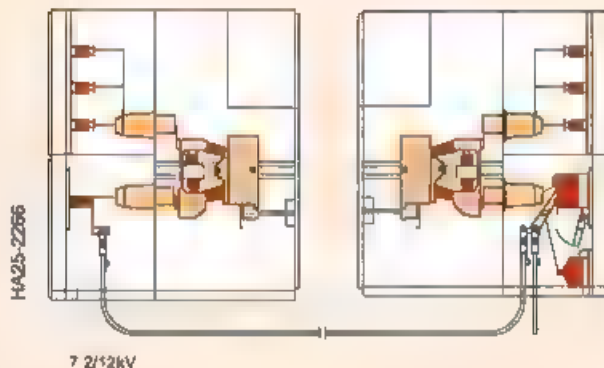
1) 西门子通常使用的密封电缆头或类似尺寸的其他产品

1) Siemens conventional sealing ends or other makes with similar dimensions

双母线柜 面对面布置

• 用途

- 双母线柜主要使用在下述场合:
- 需要高度可靠的连续供电
- 主供母线时不允许有停电时间
- 用于发电、母线的连接或者重要负荷非重要负荷的切换
- 面对面布置特点
- 无需断开另一段母线,即可检查某一段母线
- 只需一个通道
- 更换母线操作的一段母线隔离
- 整体布置清晰
- 在同一柜内,布置电缆接线,接地开关,电流互感器,电压互感器
- 使用特殊的终端连接装置,因此仅需一套电流互感器
- 可移开部分(接地)开关机械和电气联锁
- 在现场,用电缆或铜排在电缆沟内将两排开关柜连接在一起
- 在现场,可方便地将低压控制线接到柜内



面对面布置
Face-to-face arrangement

Duplicate busbar panels Face-to-face arrangement

• Application

Duplicate busbar installations are mainly used:

- In stations requiring a very high security of supply
- For no-break busbar changeover
- For separating on-plant and off-plant generation or essential and nonessential loads.
- Special features of face-to-face arrangement
- Inspection of a busbar system possible without isolation of the second system
- Only one access aisle required
- Short distances for busbar changeover
- Clear overview
- Cable connection, earthing switch, current and voltage transformers in the same panel
- With special terminal links only one set of current transformers needed
- Mechanical and electrical interlocking of withdrawable sections / earthing switch
- On-site linking of the two rows by cables or bars in cable basement
- On-site wiring of LV circuits to facing panel

背靠背布置

• 用途

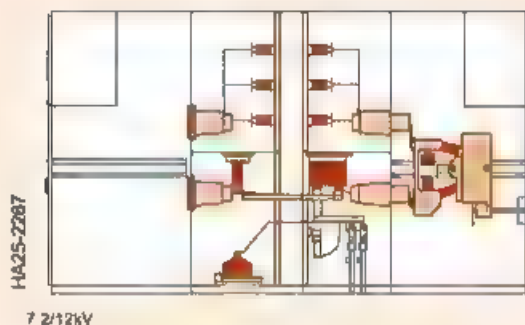
- 与面对面布置相同
- 背靠背布置特点
- 无需断开另一段母线即可检查某一段母线
- 两柜在其内部可铜排连接,此工作在制造厂内完成
- 制造厂完成柜内接线
- 主供部分(接地)开关机械联锁
- 仅需一套电流互感器
- 在同一柜内,可布置电缆接线,接地开关,电流互感器

Back-to-back arrangement

• Application

as for face-to-face arrangement.

- Special features of back-to-back arrangement
- Inspection of a busbar system possible without isolating the second system
- Panels linked by bars inside the enclosure, factory-tested
- Wiring of LV circuits inside enclosure factory-tested
- Mechanical interlocking of withdrawable sections/earthing switch factory-tested
- Only one set of current transformers needed
- Cable connection, earthing switch and current transformers in the same panel.



背靠背布置
Back-to-Back arrangement

联锁

当联锁条件满足后,可以进行下述操作:

- 将可移开部分从断开位置移至工作位置
低压插头插入
高压室门关闭,
或地线在断开位置
- 将可移开部分从工作位置移至断开位置 断路器分闸
- 操作断路器
处于分闸状态的断路器只有在位于紧靠门内的
位置和工作位置时,才可操作。处于这两个位置
之间的任何位置,断路器均不能被操作。
- 操作接地开关
可移开部分已移至紧靠门后的位置)
- 接地开关
可移开部分已移至紧靠门后的位置)

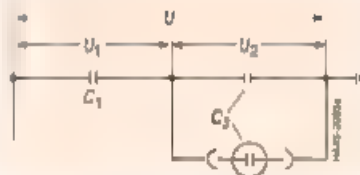
Interlocking

The following operating procedures can be carried out as soon as the interlocking conditions have been satisfied

- Moving of the withdrawable section from the disconnected position to the connected position
LV connector plugged in
HV compartment door closed
Circuit-breaker in the OPEN position
(Make-proof) earthing switch in the OPEN position
Moving of the withdrawable section from the connected position to the disconnected position
Circuit-breaker in the OPEN position
Operating the circuit-breaker
Withdrawable section in the interlocked end position
Operating the (make-proof) earthing switch
- Withdrawable section in the interlocked disconnected position
Opening the HV compartment door
Withdrawable section in the interlocked disconnected position"

容性带电显示器

Capacitive voltage detector



• 原理

- 电容 C_1 是在电流互感器或环氧树脂浇注绝缘子内由分压器决定的一个电容
- 电容 C_2 是由导体和显示器对地电容构成的另一个电容

• 特点

- 将电压器直接插入到各个插座上即可直接检查是否带电

- 如果某相有高压,显示器将会闪烁
- 还可以在相插座中进行相位比较
- 带电显示器装置可以长期工作,显示器可永久插入插座
- 该系统在所有工作状态下,都不会受断路器操作时的电弧而受影响
- 该系统在出厂、试验时,已经过检验
- 此种显示器可以接在任何交流电源电压4-5V的插座上(通过测试)
- 标准技术条件
- 检测器的规格符合 VDE0681, 第 4 部分 (电压测试器) 的规定
- VDE 标准正在考虑将这系统做为检查带电试验设备是否与电源脱离的基本手段

• Principle

- The capacitance C_1 is provided by suitable grading layers in the current transformer or cast-resin insulators
- The capacitance C_2 is provided by the capacitance of the conductors and the voltage detector to earth.
- Special features
- The voltage detector is plugged into pairs of sockets (in the door of the LV compartment) for pole-by-pole verification of safe isolation from supply
- The voltage detector flashes if there is an HV supply present
- Phase comparison at the pairs of sockets is possible
- The voltage detector is designed for continuous operation and can remain permanently plugged in
- The system is shock-proof in all operating states
- The system is routine-tested at the factory
- The voltage detector can be tested in any mains socket outlet with an AC supply 4-5V
- Standards and specifications
- The range of the detector complies with VDE 0681 Part 4 (specifications for voltage testers)
- VDE regulations for this type of system to be accepted as the sole means of verifying safe isolation from supply are in preparation.

母线

• 材料

普通铜排,很容易在厂场买到

• 母线安装

- 在标准型空气树脂浇注的绝缘子
- 母线与母线之间用螺栓紧固在一起,长度要视母线的宽度。

• 母线的隔离

- 可移开部分与电缆或铜排母线在各自的金属铠装隔室中,防护等级为 1P4X / IP40

- 在横排开关装置中,母线室可以任意穿穿,还可以在相邻两母线之间设有隔板。

- 母线室门盖,防止内部电弧故障型

• 绝缘

- 不需要对母线增加辅助的绝缘措施,因为母线室有足够的绝缘强度

High-voltage compartment Busbars

- Material
- Normal commercial flat copper bar, easily available
- Busbar mounting
- On standard cast-resin insulators
- Busbars bolted together, length according to panel width
- Compartmentalization
- Metal cladding to withdrawable section compartment and connection
- Busbar compartment continuous throughout entire installation
- Barriers between neighbouring panels possible
- Busbar compartment optionally resistant to internal arcing.
- Insulation
- No busbar insulation needed since there is adequate electric strength without insulation



母线室
Busbar compartment

1) 在 DIN VDE0670 第 8 部分或 IEC 出版物 298

规定之外增加的联锁

Additional interlocks in excess of DIN VDE0670, Part 5 or IEC Publication 298

al Design 机械设计部分

母线装置

下述的母线装置可供选用，
这些母线装置对压力释放装置没有任何不利影响

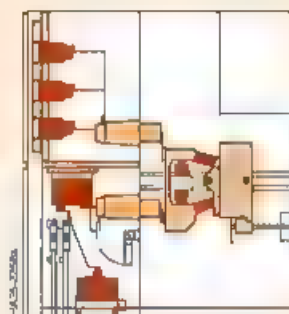
- 电流互感器
- 环氧树脂浇注支柱型电流互感器
- 严格按 DIN 42600 设计
- 最多可安装 3 台

Busbar fittings

The following optional fittings are available for the busbars.

They have no adverse effect on pressure relief

- Current transformers
- Post-insulator current transformers cast-resin insulated
- Narrow design to DIN 42600
- Max .3 x

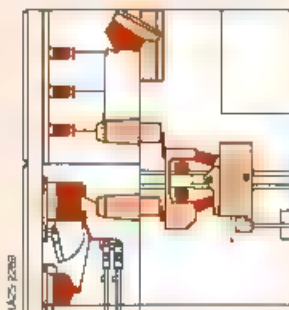


7.2/12kV

可移开式断路器柜 (剖面图)，在母线室装有 3 台电流互感器

Withdrawable vacuum circuit-breaker panel (sectional view) with three current transformers in the busbar run

- 或电压互感器
- 环氧树脂浇注式
- 最多可安装 3 台单极式或 2 台双极式
- Or voltage transformers
- Voltage transformers, cast-resin insulated
- Max .3 x single pole or 2 x two pole

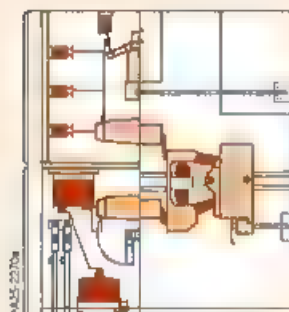


7.2/12kV

可移开式断路器柜 (剖面图)，在母线室装有电压互感器

Withdrawable vacuum circuit-breaker panel (sectional view) with voltage transformers in the busbar run

- 或接地开关
- 手动操作
- 可选择通常的机械方式或电磁联锁
- Or earthing switch
- Manual operation
- Optional locking or electromagnetic interlocking



7.2/12kV

可移开式断路器柜 (剖面图)，在母线室装有接地开关

Withdrawable vacuum circuit-breaker panel (sectional view) with earthing switch on the busbar

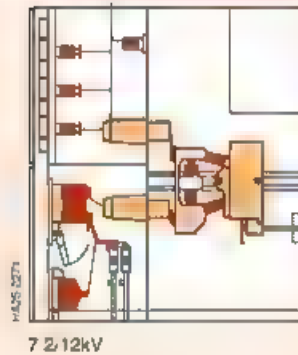
母线装置(接上页)

- 或母线提升机
- 额定三相交流母线最大额定电流
- 连接铜排安装在一个环氧树脂浇铸的绝缘子上
- 封闭母线桥架可根据需要加1

Busbar fitting

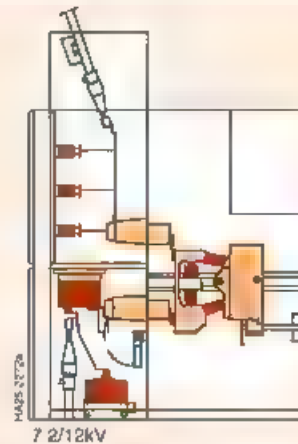
(continued)

- Or bus riser
- Rated current corresponding to max. rated busbar current
- Connecting bars mounted on three cast-resin insulators
- Required bus duct can be modified



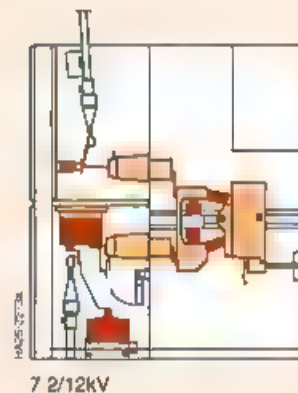
可移开式真空断路器柜(剖面图), 母线提升式
Withdrawable vacuum circuit-breaker panel (sectional view) with bus riser

- 或电缆上进线
- 每相最多接2根500mm² 截面单芯交联聚乙烯电缆1)
- 设有电缆终端隔室, 其中装有夹持件和支架。
- Or cable connection
- Max. 2 x 500mm², single-core XLPE cables per phase¹⁾
- With cable termination compartment and clamp support rail.



可移开式真空断路器柜(剖面图), 电缆与母线相连接
Withdrawable vacuum circuit-breaker panel (sectional view) with cable connection to busbars

- 或电缆上进线
- 每相最多接2根500mm² 截面单芯交联聚乙烯电缆¹⁾
- 电缆终端在柜内, 并有夹持件和支架
- Or cable connection
- Max. 2 x 500mm², single-core XLPE cables per phase
- Cable termination inside the panel with clamp support rail



可移开式真空断路器柜(剖面图), 用电缆与母线相连接
Withdrawable vacuum circuit-breaker panel (sectional view) with spur connection

1) 西门子通常采用密封电缆头或类似尺寸的其他产品

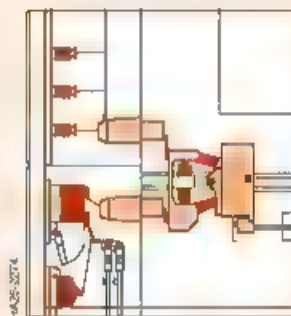
1) Siemens conventional sealing ends or other makes with similar dimensions.

开关柜的接线方式

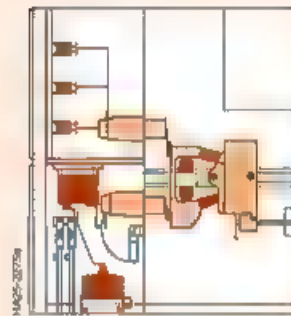
- 将电缆或铜排固定在电流互感器或绝缘子上接线
- 各种不同的接线安装方式见图示
- 通过接地开关，直接在连接处将回路接地并短路
- 固定式的电压互感器处于电流互感器的保护区内

Panel connection

- Connection of cables or bars to current transformers or insulators
- Connection variants or types or installation are as shown in the illustrations
- Earthing and short-circuiting via earthing switch directly at the point of connection
- Fixed-mounted voltage transformers within the current transformer protection zone



从前面接线
Connection from front



从后面接线
Connection from rear

柜内连接装置

下述器具或部件可供选择，用于相关的设计中：

- 每相最多可接 4 根 500mm² 单芯交联聚乙烯电缆及西门子密封电缆头，也可采用尺寸相近的其它产品
- 或针插拔式，防松密封电缆头连到底板
- 和/或片铜排连接
- 有套管的铜排槽，也可选择有绝缘层的铜排连到底板
- 和/或电压互感器
- 环氧树脂浇铸的支柱型电流互感器
- 接近 DINCR600 设计要求的电流互感器
最多可安装 3 台
- 和/或电压互感器
- 环氧树脂浇铸的电压互感器
- 最多 3 台单极或 2 台双极的电压互感器
- 固定式安装的，而且柜内没有熔断器
- 移开式安装的电压互感器，在初级绕组熔断器。互感器的电输入来自断路器。当一次回路自动接地并短路时，才可接触电压互感器
- 和/或接地开关
- 手动，也可选用电动机驱动的（在紧急操作时，永远可以手动）接地开关
- 也可选具有特定合电流能力的快速接地开关
- 除了有标准的接地开关外，移开部分连接外，还可选择附加的电磁联锁
- 和/或避雷器或过电压限制器
- 避雷器用于保护开关装置，防止外来侵入的过电压
- 限制器用于保护负载，防止操作过电压的破坏
- 最多装 3 台

Panel connection fittings

The following optional fittings are available for panel connection according to the relevant project planning documentation:

- Connection of max. 4x 500mm² single-core XLPE cables per phase with Siemens sealing ends or other makes of similar size
- Or connections for plug-in, shock-proof sealing ends, including floor plate
- Or connection for bars.
Flat copper bar with bushings, optionally with floor plate of fully insulated bars including floor plate

	从前面 from front	从前面 from front	从前面 ¹⁾ from front ¹⁾	从前面 from front
接线方式 Connection	从前面 from front	从前面 from front	从前面 ¹⁾ from front ¹⁾	从前面 from front
电缆室的压力释放方向 Pressure relief of connection compartment	向下 downwards	到后面 to rear	向上 upwards	向上 upwards
电缆室的释放通道 Rear side duct	无 without	无 without	有 ¹⁾ with ¹⁾	有 with
安装方式 Installation	靠墙安装 Wall mounting	靠墙安装 Wall mounting	靠墙安装/自由站立 ¹⁾ Wall mounting/free standing ¹⁾	自由站立 Free standing
电缆室与墙距离 Wall clearance (mm)	50	150	min 50 ¹⁾ 最小 50 ¹⁾	min 500 最小 500

- And/or transformers
- 4MA post-insulator current transformers, cast-resin insulated
- Narrow design to DIN42800
Max. 3X
- And/or voltage transformers
- 4MF voltage transformers
cast-resin insulated
- Max. 3X single-pole or 2X two-pole
- Fixed mounted, without primary fuses
- Withdrawable, with primary fuses
voltage pickoff on the circuit-breaker
- Automatic earthing or primary terminals and isolation of secondary circuits during access to voltage transformers
- And/or earthing switch
- Manual operation, optional motor drive, (manual emergency operation always possible)
- Optional making capacity
- Additional, to standard interlocking of earthing switch/withdrawable section, optional locking or electromagnetic interlocking

- And/or surge arresters or surge limiters
- Limiters for protecting the loads against switching overvoltages
- Max. 3X

1) 对于 7.2/12kV，短路开断电流 50kA 的开关装置，只能从前面接线且只有在柜内有压力释放通道。
柜的前面与墙之间的最小距离必须至少 500mm。在这个距离内必须有盖板。
For switchgear with rated short-circuit breaking current 50kA at 7.2/12kV only connection at front and with rear mounted pressure relief duct is feasible.
Rear distance between switchgear and wall must be 500mm at least
For this rear distance cover plates must be provided.

构架

- 结构
 - 由螺栓连接的钢构架和钢板组成
 - 可移开部分用导轨支撑
- 表面处理
 - 钢构件和钢板涂镀锌
 - 门及前面板喷涂浅灰色粉末漆
 - 端板喷涂浅灰色粉末漆

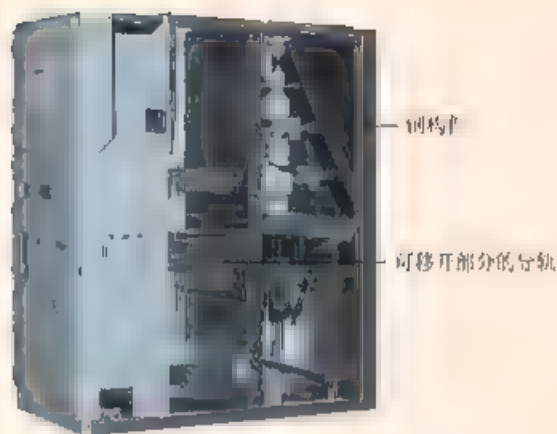
各室之间的分隔

- 结构
 - 由螺栓连接的镀锌钢板将开关室分隔为：母线室、高电压电缆室
 - 各单独隔室之间的防护等级为 IP4X/IP40
 - 由于使用插入式的绝缘套管，即使可移开部分在打开位置，各隔室之间也是不通的
 - 上部及下部的触头固定在触头罩
 - 在移动可移开部分时，通过机构，金属活门可打开或关闭
 - 当拉出可移开部分后，金属活门遮盖住触头罩
 - 上部活门（可接近母线）或下部活门（可接近电缆），均可松开螺栓卸下来，相互之间没有联系

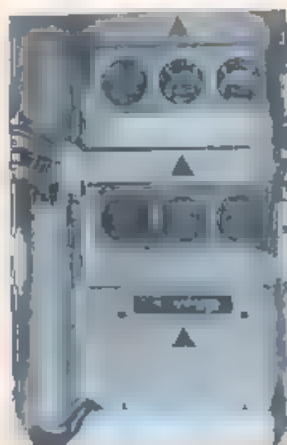
隔板

隔板的作用是将相邻小室分为互为不相通的隔室

- 结构
 - 镀锌钢板
 - 母线室可选择有套管的隔板。
 - 与相邻室之间的防护等级为 IP4X/IP40
 - 相邻开关室的母线室也可选择贯穿式的



隔板移开后的开关柜视图



活门开启后的插入式绝缘套管



活门关闭后盖住插入式绝缘套管



有隔板的开关柜

Frame

- Construction
- Bolted steel sections and sheets
- Rails to support the withdrawable section
- Optional floor plate
- Surface treatment
- Steel sections and sheet galvanized
- Doors and front frame powder-coated grey
- Installation side panels powder-coated grey

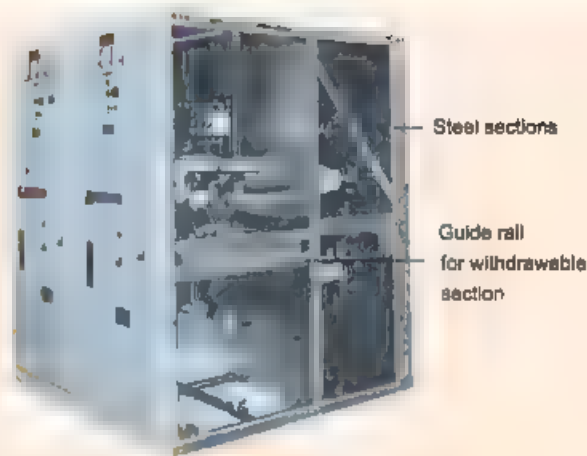
Compartmentalization

- Construction
- Bolted galvanized steel sheets divide the panel into the busbar compartment, withdrawable section compartment and connection compartment
- Degree of protection between individual compartments: IP4X/IP40
- Complete compartmentalization maintained even with withdrawable section in connected position on account of the fitted penetration-type bushings
- Upper and lower mating contacts fixed in penetration-type bushings
- Enforced operated metal shutters for opening or closed the penetration-type bushings while the withdrawable section is being moved
- Metal shutters can be locked when the withdrawable section is racked out
- Upper barrier (access to busbar) or lower barrier (access to cable) can each be unscrewed independently of the other

Partitions

These segregate neighbouring panels from one another

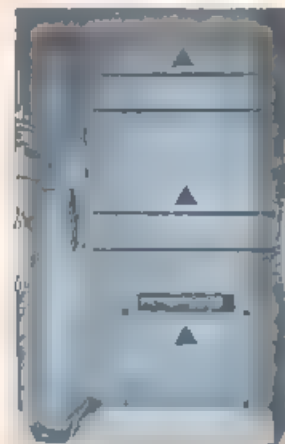
- Construction
- Galvanized steel sheet
- With cutout for continuous busbars
- Optional bushing plate with cast-resin bushings as end barrier for the busbars
- Degree of protection to neighbouring panels: IP4X/IP40



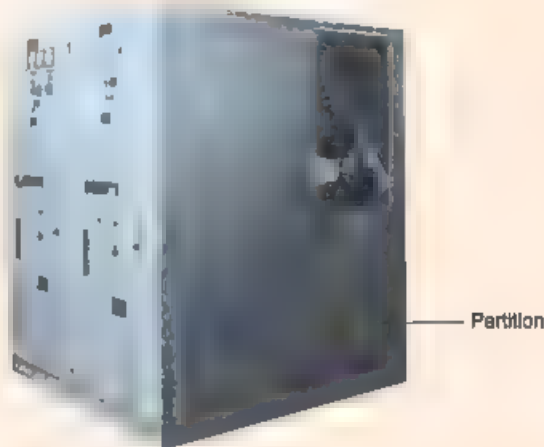
Panel with partition removed



Withdrawable section compartment metal shutters opened



Withdrawable section compartment metal shutters closed



Panel with partition

压力释放

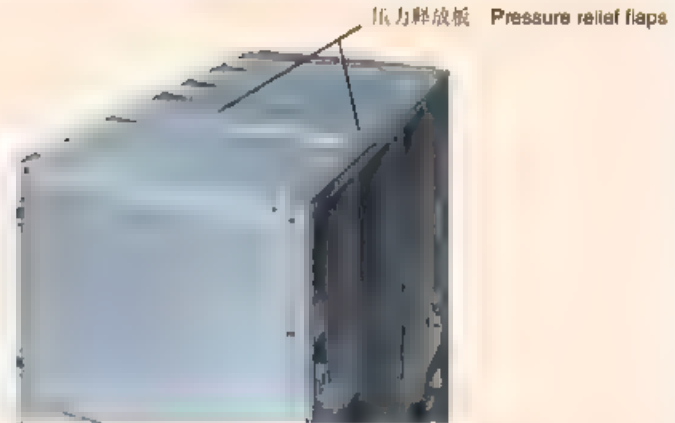
任何因柜内电弧故障产生的过高压力的压力释放板排出。

- 结构
 - 镀锌钢板
 - 不能从外部打开
 - 母线室、高电压室和电缆室都有各自的压力释放板

Pressure relief

Any overpressure inside the panel resulting from fault arcing is released by the pressure relief flaps.

- Construction
 - Galvanized steel sheet
 - Cannot be opened from outside
 - Separate pressure relief flaps for busbar compartment, withdrawable section compartment and connection compartment



压力释放板
Panels with pressure relief flaps

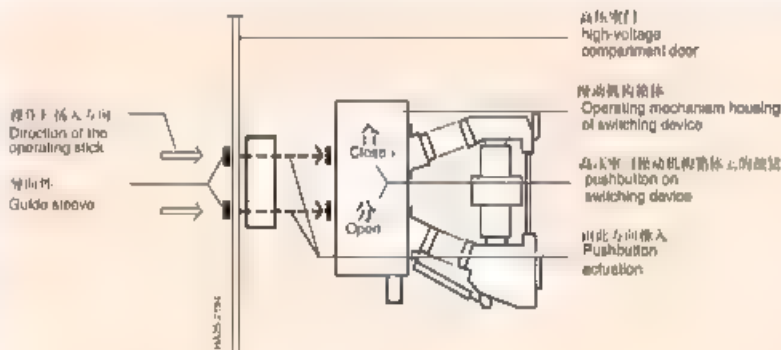
高压室门

- 观察窗
- 抗压力
- 用于检查可移开部分的位置
用于检查断路器的合/分指示器、操作次数计数器和“弹簧储能”指示器
- 锁
用钥匙（当符合联锁条件时）将高压室门锁住或打开
- 前柄插入盖板
- 前柄用于使机构中的弹簧储能
- 活门，可自行关闭
- 门把手
开锁以后，提起门把手，门即可打开
将之按下，门即关上（必须符合联锁条件）

- 当可移开部分处于工作位置/试验位置，且高压室门关闭时，旋转旋钮至穿孔，插入操作杆进行分合闸操作
- 打开挡住插入孔的挡板，以便推动可移开部分
- 前柄用来推进或退可移开部分（当联锁条件满足时）

High-voltage compartment door

- Inspection windows
- Pressure resistant
- For checking the position of the withdrawable section
- For checking the CLOSE/OPEN indicator of the switching device, the operations counter and the "closing spring charged" indicator
- Lock
- For locking and unlocking the high-voltage compartment door by interlock key (complying with interlocking conditions)
- Access shutter for hand crank
- Hand crank for charging the operating mechanism springs of the switching device
- Access shutter closes automatically
- Door handle
- Lifting this handle, after releasing the lock, opens the door, lowering the handle closes the door (complying with interlocking conditions).
- CLOSED/OPEN pushbuttons for switching device
- CLOSED/OPEN switching with withdrawable section in working/ testing position: with HV door closed turn the locking plate aside to expose the opening and insert the operation stick to push the button
- Lever for unfolding the extension mechanism (see opposite diagram)
- Access shutter/Opening for operation of the withdrawable section
- For the crank handle for moving the withdrawable section (complying with interlocking conditions)
- For the interlock key of the withdrawable section (same key as for the high-voltage compartment door).



用于操作（合、分）柜内真空断路器的延伸杆
Folding extension mechanism for push button actuation, e.g. panel with vacuum circuit-breaker

可移开部分

可移开式真空断路器

(有关技术数据请参阅第 7 页)

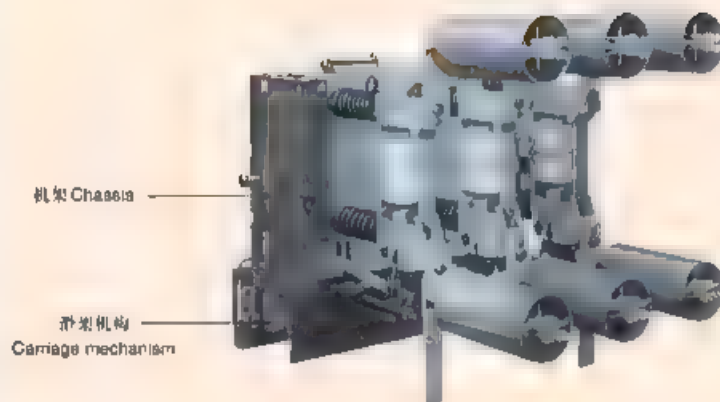
- 安装有 3AH 真空断路器及弹簧储能操作机构

Withdrawable sections

Withdrawable vacuum circuit-breaker section

(For technical data see page 7)

- Fitted with 3AH vacuum circuit-breakers with spring stored-energy operating mechanism.



可移开式真空断路器部分

Withdrawable vacuum circuit-breaker section

可移开式真空接触器

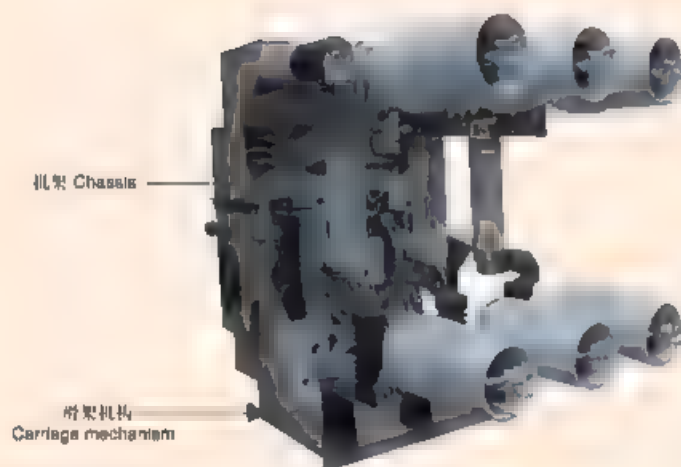
(有关技术数据请参阅第 6 页)

- 装有电磁操作机构的 3TL6 型真空接触器
- 有高压限流熔断器每相最多装串联的两根
- 也可选用机械锁扣结构,以节约保持合闸状态所需电能

Withdrawable vacuum contactor section

(For technical data see page 6)

- Fitted with 3TL6 vacuum contactor with solenoid operating mechanism
- With HV HRC fuses optionally 2x parallel per phase
- Also optionally with mechanical ON-latching of vacuum contactor to reduce holding power



可移开式真空接触器

Withdrawable contactor section

可移开部分

可移开式隔离排连接部分

(有关技术数据参阅第5页)

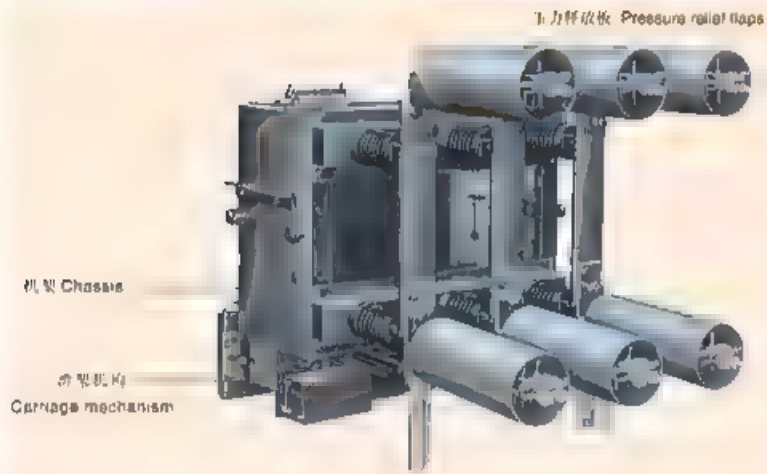
- 作隔离开关用
- 装有铜质连接
- 联锁用挂锁

Withdrawable sections

Withdrawable disconnector-link section

(For technical data see page 5)

- Performs disconnector function
- Fitted with copper links
- Padlock for interlocking



可移开式隔离排连接部分

Withdrawable disconnector-link section

可移开式测量部分

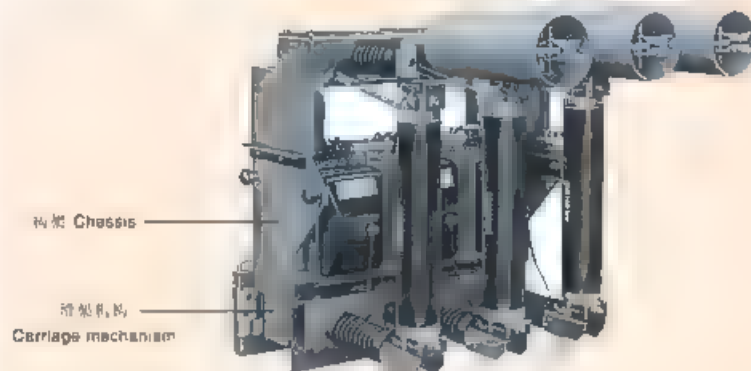
(有关技术数据参阅第6页)

- 装有环氧树脂浇注的电压互感器最多可安装3台单极或2台双极的互感器
- 可选择在互感器初级安装熔断器
- 也可选择安装3台避雷器

Withdrawable metering section

(For technical data see page 6)

- Fitted with voltage transformers, cast-resin insulated, max. 3x single-pole or 2 x two-pole
- Optionally with primary side fuses.
- Also optionally with 3 x surge arresters.



可移开式测量部分

Withdrawable metering section

机架:

- 作为开关装置的支撑构架
- 侧板 装有轴承滚轮, 可在柜内导轨上移动
- 导轨

滑架机构

- 装在操动机构箱体的下面
- 有驱动机构, 用以推进、拉出可移开部分
- 也可选用电动机驱动方式
- 内部有联锁杆, 用以探测在打开位置或断开的装置时, 断路器的合/分状态
- 有联锁杆, 用以探测高压门和接地刀的状态
- 也可用辅助开关, 当可移开部分处于不同位置时, 给出相应的信号
- 可选装电磁联锁装置, 控制可移开部分

Chassis

- For supporting the switching device
- Side plates with ball-bearing rollers which run in the rails of the panel frame
- Guide rails.

Carriage mechanism

- Mounted underneath the operating mechanism of the switching device
- With drive spindle for moving the withdrawable section
- With optional drive motor
- With interlock rod to interrogate the CLOSED/ OPEN position of the switching device in connected or disconnected position, respectively
- Interlock rods for interrogating high-voltage compartment door and position of earthing switch
- Optional auxiliary switch for withdrawable section position signalling
- Optional electromagnetic interlocking of withdrawable section.

cal Design 机械设计部分

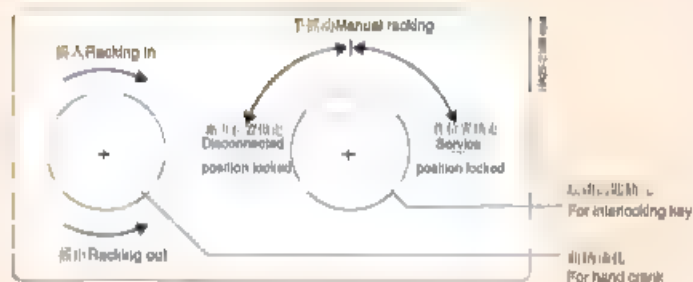
可移开部分

手动操动机构

- 将联锁钥匙旋向“手摇动”位置
- 这样就打开了曲柄插孔的挡板，即插入曲柄，将可移开部分推进或退出。

Withdrawable section Manual operating mechanism

- Turn interlock key to "manual racking" position
- This opens the access shutter for the hand crank, the withdrawable section can be racked in or out.

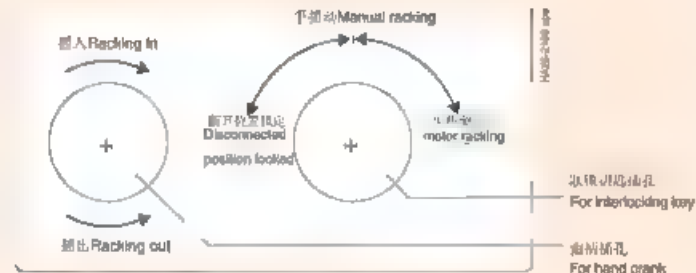


电动机操动机构

- 将联锁钥匙旋向“电动机驱动”位置
- 在柜前或遥控，进行推进或退出可移开部分的操作
- 手摇曲柄时，将联锁钥匙旋至“手摇动”位置
- 这样就打开了曲柄插孔的挡板，然后就可将可移开部分推进或退出。

手动操作机构挡板的开启

Access shutter/Opening for manual operating mechanism



Motor operating mechanism

- Turn interlock key to "motor racking" position
- Racking of withdrawable section either locally or remotely.
- For manual, turn interlock key to "manual racking" position
- This opens the access shutter for the hand crank, the withdrawable section can be racked in or out.

电动机操作机构挡板的开启

Access shutter/Opening for motor operating mechanism

触头

- 镀银扁铜排触头
- 触指的弹性好($\pm 10\text{mm}$)
- 可互换

当更换触头时，请注意：

- 触头的额定值，可移开部分的630A触头与1250A触头完全可互换，当对其它额定值的触头来更换时，在结构上不能相配，从而避免了随意更换的误操作。

1) "断开位置锁定" 不能用于接地开关的电动机驱动机构

Isolating contacts

- Flat copper contacts, silver-plated
- Resilient mounting (tolerance $\pm 10\text{mm}$)
- Interchangeable

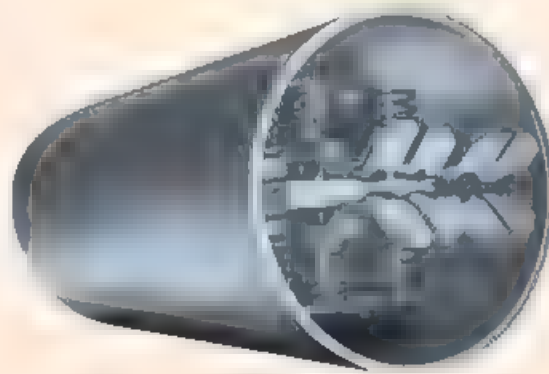
Note the following when changing contacts:

- Contact rating

630 A withdrawable sections are fully interchangeable with 1250 A withdrawable sections

With other current ratings, interchanging is prevented mechanically.

1) "Disconnected position locked" not applicable for motor operating mechanism of earthing switch



触头
Isolating contacts



低压室及接线

低压室

- 可以安装保护、控制装置、测量元件和仪表
- 通过防电弧抗压的隔板使其与高压室隔离
- 可选择在门上装设观察窗
- 内部可利用的空间尺寸见第 8 页

低压接线

- 检修部分控制电路通过 64 芯插头与金属软管内的软导线连接起来的
- 开关柜的控制电路使用软导线连接并穿入柜内金属软管中
- 电压互感器次级回路使用软铜多芯线

Low-voltage compartment and wiring low-voltage compartment

- For accommodating the devices for protection, control, measurement and metering
- Shock-proof and pressure-resistant partitioning from the high-voltage compartment
- Door optionally with inspection window
- For usable fitting dimensions see page 8

Low-voltage wiring

- Withdrawable section control circuit wires via 64-pole plug connector flexible wires in a metal conduit
- Panel control circuits with flexible wires, metal-enclosed
- Flexible multi-core wires for instrument transformer secondary circuits



内部装有设备的低压室

Low-voltage compartment with built-in equipment

标准 Standards

标准、技术条件及导则

标准与技术条件

8BK20 型室内开关装置符合下述标准与技术条件

- EC 出版物 298 以及附录 AA 和 IEC 出版物 694
- DIN VDE 0670, 第 6 部分 801 和 1000
- PEHLA 导则 No.4
- ANSI C37.20c, 1974 (主绝缘要求)
- NBN 810
- BS 5227
- SEN 36 2103
- N.E.N. 10298

载流能力

- 按照 DIN VDE 0670 第 6 部分和 1000 部分、以及 IEC 298 或 694, 载流能力与下列环境温度有关

- 24 小时平均最高温度	+35℃
- 最高温度	+40℃

- 开关柜和母排的载流能力取决于柜外环境温度
- 在封闭的开关柜内, 载流能力因通风的限制而有所下降, 采用下列措施后可以将之提高

- 使用更大容量的断路器
- 自然通风, 即在高压室门和柜前盖板开设防护纱网的通风槽
- 强制通风, 即在高压室内, 开设防护纱网的通风槽, 在柜顶部安装风扇

按 EEC 成员国达成一致的协议认为, 这些国家标准符合 IEC 298 号出版物

绝缘强度

- 经试验验证, 开关装置和工频耐受电压和冲击耐受电压符合 DIN VDE 0670, 第 1000 部分和 IEC 694 号出版物, 为了适合中国电力系统的要求, 将工频耐受电压提高到中国标准 DL404 的要求, 这些数值在表中用 * 标出
- 表中的额定值对应的条件是:
海平面和正常的气候条件 (1013hpa 20℃ 11g/m³ 湿度, 符合 DIN VDE 0111 和 IEC 71 号出版物规定的标准状态)
- 如果空气随着海拔的升高而减少, 绝缘强度可以通过用于海拔 1000m 以上高度的修正因数来计算。

Standards, specifications, guidelines

Standards and specifications

Type 8BK20 switchgear for indoor installation complies with the following current standards and specifications

- IEC Publication 298 with appendix AA and IEC Publications 694
- DIN VDE 0670, Parts 6, 60 and 1000
- PEHLA Guideline No.4
- ANSI C37.20c 1974 (principal requirements)

- NBN 810
- NF C64 400
- BS 5227
- SEN 36 2103
- N.E.N. 10298

In accordance with the harmonization agreement reached by the EEC countries, their national standards conform to IEC Publication 298.

Current-carrying capacity

- According to DIN VDE 0670, Part 6 and 1000 and IEC 298 or 694, current carrying capacities are referred to the following ambient temperature:

- Maximum of 24 hour mean +35℃
- Maximum +40℃

- The current-carrying capacity of the switchgear panels and busbars depends on the ambient temperature outside the enclosure

- In the enclosed switchgear panels, the current-carrying capacity can be partly reduced by the restricted ventilation. It can be increased by:

- Using a circuit-breaker with a high rated current
- Through-ventilation, i.e. proof-proof ventilation, slits in the high-voltage compartment door and in the top cover plate
- Forced ventilation, i.e. proof-proof ventilation slits in the high-voltage compartment door in conjunction with a fan on the top cover plate.
- **Insulating capacity**
The insulating capacity is verified by testing the switchgear and the rated values of power-frequency withstand voltage and impulse withstand voltage according to DIN VDE 0670, Part 1000 and IEC Publication 694
- In order to meet the requirement of Chinese power system values of power frequency withstand voltage has been increased to the ratings in DL404. These values are marked with * in the table
- Rated values are referred to sea level and to normal atmospheric conditions (to 1013 Pa, 20℃ 11g/m³ humidity in accordance with DIN VDE 0111 and IEC Publication 71).
- The insulating capacity if air decreases with increasing altitude, and can be calculated by using a correction factor for sites higher than 1000m above sea level.

额定电压 (有效值) Rated voltage (rms)	工频耐受电压 (有效值) Rated power-frequency withstand voltage (rms)		冲击耐受电压 (峰值) Rated impulse withstand voltage (rms) (peak)	
	相间 for isolating distances	相间及相对地 between phases and to earth	相间 for isolating distances	相间及相对地 between phases and to earth
	kV	kV	kV	kV
7.2kV List 2	23 32*	20 32*	70	60
12kV List 2	23 48*	28 42*	85	75

标准, 技术条件与导则 Standards, specifications, guideline

防止异物侵入开关柜
Protection against ingress
of solid foreign bodies

防护等级规定如下:

根据DIN VDE 0670 第6部分, IEC标准298或DIN VDE 0470第1部分及IEC标准529

Protection against electric shock and ingress of solid foreign bodies

• The degree of protection to DIN VDE 0670, Part 1 and IEC Publication 529 are as follows

标准/技术指标 Standard/ specification	编号 No.	防护等级 Degree of protection
DIN VDE 第6部分 IEC 标准 298 DIN VDE 0670, Part 6, IEC Publ. 298	IP4X	防止厚度大于1mm的线状或带状物侵入和与接近导体和可移开部分, 对防水无要求。 Protection against to live parts and contact with internal moving parts by wires or strips of thickness greater than 1 mm. No specification regarding protection against water
DIN VDE, 第6部分 IEC 标准 298 DIN VDE 0670, Part 6, IEC Publ. 298	IP40	防止厚度大于1mm的线状或带状物侵入和与接近导体和可移开部分, 对防水无防护要求。 Protection against to live parts and contact with internal moving parts by wires or strips of thickness greater than 1 mm. No against protection penetrating water
	IP41	防止厚度大于1mm的线状或带状物侵入和与接近导体和可移开部分, 可防止垂直方向的滴水。 Protection against to live parts and contact with internal moving parts by wires or strips of thickness greater than 1 mm, protection against vertically dripping water
	IP50	防止有害灰尘沉积; 不防滴水。 Protection against harmful dust deposits. No protection against penetrating water
	IP51	防止有害灰尘沉积; 防止滴水。 Protection against harmful dust deposits. Protection against penetrating water

• 8BK20 开关柜的防护等级 • Degrees of protection for type 8BK20 switchgear.

开关柜 Panel	无通风槽开关柜的防护等级 标准型 可选型 Degree of protection panel without ventilation slots standard optional		有通风槽开关柜的防护等级 标准型 可选型 Degree of protection panel with proof ventilation slots standard optional	
高压室门关闭时 with HV compartment door closed	IP4X IP40	IP41 IP50 IP51	IP4X IP40	IP41
高压室门开启时 with HV compartment door opened	IP4X IP40	—	IP4X IP40	—

• 8BK20 开关装置的防护等级: • Degrees of protection for type 8BK20 switchgear

无通风槽时 Degree of protection panel without ventilation slots 标准型 可选型 standard optional		设有带防雨网的通风槽时 Degree of protection panel with proof- ventilation slots 标准型 可选型 standard optional	
IP4X IP40	IP41 IP50 IP51	IP4X IP40	IP41

内部电弧故障的防护

- 在进行证实开关柜的防护内部电弧故障能力的试验中，应对操作人员加以适当的安保护。
- 关于防护内部电弧故障能力的试验，可由操作人员与制造厂家按DIN VDE 0670, 第6部分和IEC 298号出版物来进行。
- 试验必须按照DIN VDE 0670, 第601, PEHLA导则 No. 4 以及IEC 298号出版物和附件AA进行。
- 8BK20型开关装置能够达到上述标准和技术条件，并说明如下：
 - 标准 1 至 3 和 6 是标准方案
 - 标准 1 至 6 需带有附加措施才能达到
 - 各标准的定义如下
 - 标准 1, 门和盖板安全可靠，在工作中不可打开
 - 标准 2, 可能造成危险的部件不会飞离
 - 标准 3, 在柜体的外部可以接触的部位，不应出现孔洞
 - 标准 4, 垂直布置的指示器未引燃
 - 标准 5, 水平布置的指示器未引燃
 - 标准 6, 接地连接始终可靠
 - 对内部电弧故障的防护
 - 可以符合或超过上述标准和技术条件的要求
 - 这时，内部电弧的影响被限制在柜内
 - 对相邻的开关柜不会因压力增大而产生影响，能防止在可移开部分产生的压力分别对电缆室和母线室的影响（仅对最大额定电流至 2500A的馈电柜而言），能防止在母线室产生的压力分别对可移开部分和电缆室的影响（仅对最大额定电流至 2500A的馈电柜而言）
 - 压力开关(可选择的保护元件)
 - 可将电弧故障的持续时间限制在100ms
 - 使电弧故障造成的损害减至最小
 - 建议试验时保护时间>0.5s
 - 压力开关的功能试验可在不切断电源时进行
 - 压力开关动作，使进线断路器脱扣

Resistance to internal arc faults

- Tests for verifying resistance to internal arc faults should establish proper protection for operating personnel.
- Tests for resistance to internal arc faults can be agreed between operator and manufacturer according to DIN VDE 0670, Part 6 and IEC Publication 298
- The tests must be performed in accordance with DIN VDE 0670, part, 601, PEHLA Guideline No.4 and IEC Publication 298, Appendix AA.
- Type 8BK20 switchgear conforms to the criteria of the above standards and specification
 - Criteria 1 to 3 and 6 in the standard version
 - Criteria 1 to 6 with additional measures

- The definitions of the criteria are as follows.
 - Criterion 1
Correctly secured doors, covers do not open.
 - Criterion 2
Parts which may cause a hazard do not fly off.
 - Criterion 3
No holes in the freely accessible external parts of the enclosure.
 - Criterion 4
Vertically arranged indicators do not ignite
 - Criterion 5
Horizontally arranged indicators do not ignite.
 - Criterion 6
Earthing connections are still effective
- Resistance to internal arc faults
 - Can be provided over and above the requirements of the above-mentioned standard and specifications.
 - In this case the effects of an internal arc are then confined:
 - pressure-proof to the neighbouring panels,
 - pressure-proof from withdrawable section compartment respectively connection compartment to the busbar compartment (only for rated current of feeders up to 2500A)
 - pressure-proof from busbar compartment to withdrawable section compartment respectively connection compartment (only for rated current of feeders up to 2500A)
- Pressure switches (optionally)
 - Limit the duration of arcing to a maximum of 100ms
 - Minimize the damage caused by arcing
 - Recommended grading>0.5s
 - Functional test of pressure switch possible without interruption in service
 - The pressure switch trips the incoming circuit-breaker.

标准，技术条件与导则 可移开部分的几种位置

如DIN, VDE 0670, 第6部分和IEC 298号出版物所述，8BK20型开关装置的可移开部分有三个不同位置：

- 工作位置
 - 在此位置，开关装置将母线与开关柜接线连接在一起
 - 低压插头插进插座
- 断开位置
 - 可移开部分处于断开位置时，可以确保不会产生由母排到这部分发生电弧网络
 - 低压插头可以插入也可拔出插座
- 试验位置
 - 低压插头插入插座

Standards, specifications, guidelines Withdrawable section positions

There are three different positions for withdrawable sections of type 8BK20 switchgear as defined in DIN VDE 0670, Part 6 and IEC Publication 298:

- Service position
 - In this position, the switching device establishes a connection between the busbars and the panel connection.
 - The low-voltage connector is plugged in.
- Disconnected position
 - The disconnected position is assured.i.e. flashovers are only possible to earth.
 - The low-voltage connector can be plugged in or out.
- Test position
 - The low-voltage connector is plugged in.
-

联锁

- 下述联锁功能是根据 DIN VDE 0670, 第 6 部分和 IEC 298 出自出版物定义的。
- 断路器或接触器如果不是处于分闸状态, 将它们从工作位置退出或将其从断开位置推入工作位置都是不可能的。
- 如果不是在工作位置, 而是在移动过程中, 企图使断路器、负荷开关或接触器合、分操作是不可能的。
- 准备增加或改变联锁装置, 必须经制造厂与用户达成协议, 制造厂应提供所有必要的有关联锁装置特点和功能的资料。
- 对那些如果不正确地操作会将其损坏的装于主回路中的电器以及为在维护中提供绝缘距离的电器, 应该使用联锁装置将之加以保护 (例如挂锁), 只要实际上可能的话, 应使用机械联锁。
- 8BK20 型开关装置完全达到并超过上述的联锁条件。

为了避免可能发生的误操作, 8BK20 采用匙控控制的机械联锁机构以保证人员安全和操作无误。下列操作仅当相应的联锁条件满足后方可进行。

Interlocks

- The following interlocks are specified by DIN VDE 0670, part 6 and IEC Publication 298:
- The withdrawable or engagement of a circuit-breaker, switch or contactor shall be impossible unless it is in the open position.
- The operation of a circuit-breaker, switch or contactor shall be impossible unless it is in the service or disconnected position.
- The provision of additional or alternative interlocks shall be subject to agreement between manufacturer and user. The manufacturer shall give all necessary information on the character and function of interlocks.
- Apparatus installed in main circuits, the incorrect operation of which can cause damage or which are used for assuring isolating distances during maintenance work, shall be provided with locking facilities (for example, provision for padlocks). Whenever practical, preference should be given to mechanical interlocks.
- Type 8BK20 switchgear fulfils other interlocking conditions over and above those mentioned here.

To avoid any possible mal-operations, a key-controlled interlocking mechanism is adopted to ensure operators' security and normal operations. The following operations can be carried out only when the relative interlocking conditions are satisfied.

可移开部分

- 可移开部分由断开位置至工作位置:
- 低压插头插入
- 高压室门关闭
- 断路器分闸
- 接地开关断开
- 操作断路器:
- 可移开部分在工作或断开位置并被锁定
- 操作接地开关:
- 可移开部分在断开位置并被锁定

Withdrawable part

- Withdrawable part moving from disconnected position to service position:
- Low voltage plug inserted
- Door of high voltage compartment closed
- VCB switched off
- Earthing switch switched off
- Operation of VCB:
- Withdrawable part locked at either service position or disconnected position
- Operation of earthing switch
- withdrawable part locked at disconnected position

门

- 高压室门只可能在下列情况时才能打开:
- 可移开部分被锁定在断开位置
- 自动活门遮盖住静触头和触头罩, 此时防护等级为 IP4X

Door

- The door of the high voltage compartment can only open under following situations:
- Withdrawable part locked at disconnected position
- Fixed contact and insulator covered by metal shutter automatically with protection level IP4X

低压室

- 低压室位于开关柜的上部并有自己的室门。
- 低压室和高压室之间的隔板具有抵抗电弧故障的能力。
- 控制和计量电缆与可移开部分用 64 芯插头连接。
- 每个低压室的侧板上设有二次电缆的通道。
- 低压装置, 计量及保护设备可安装在门上或室内的安装板上。
- 柜内的二次接线为白色绝缘多股绞线, 其中电流回路用截面 2.5mm^2 的导线, 电压回路用截面 1.5mm^2 的导线。

Low voltage compartment

- Low voltage compartment locates on top of the panel with its own door.
- The partition between LV compartment and HV compartment is of arc-proof.
- Control and measuring cable connect withdrawable part via a 64-pole plug.
- A secondary cable duct is set on the sidewall of each LV compartment.
- LV devices, measuring and protective device can be installed on the door or board inside.
- White multi-core wringed wires are used for the secondary circuit inside panel, 2.5mm^2 for current circuit and 1.5mm^2 for voltage circuit.

标准 Standards

标准，技术条件与导则

气候与环境条件

如果需要，并增加辅助设备，8BK20 开关装置可以用于下列的类型和环境温度。

• 气候类型 11, 12, 13

该气候类型是根据 IEC 72-3-3 号出版物和西门子标准 SN 29070 第一部分定义的。

– 气候类型 11

建筑物的房间有着良好的隔热能力或其热容量高 (对冷、热均如此)，通常只对温度进行控制如通常的起居室、办公室、商店、电话总机室或精密产品储藏室。

– 气候类型 12

建筑物的房间有着良好的隔热能力或热容量较高，对室内温度未加控制，只有偶然加热或降温几天的场所，无人看管的继电器室、增压站、变压器站、马厩、机动车修理场、半成品车间、飞机库。

– 气候类型 13

建筑物房间没有专门的隔热材料，或其热容量很低，室内既无加热器也没有降温装置，例如：电话间、建筑的入口处、谷仓、无取暖设施的储藏室、棚、车库。

• 环境条件

– 自然污染

– 化学物质的污染

– 小动物

Standards, specifications, guidelines Climate and ambient conditions

Type 8BK20 switchgear, if necessary with additional measures, can be used in the following climate classes and under the following ambient conditions:

• Climate classes 11, 12, 13

The climate classes are based on IEC Publication 72-3-3 and Siemens standard SN 29070 Part 1 and are defined as follows:

– Climate class 11

Rooms in buildings with good thermal insulation or high thermal capacity heated or cooled; normally only the temperature is monitored, e.g. in normal living rooms, offices, shops, telecommunication exchanges, storage rooms for sensitive products.

– Climate class 12

Rooms in buildings with good thermal insulation or high thermal capacity heated or cooled, without temperature monitoring; heating or cooling subject to failure over several days, e.g. unattended relay, booster or transformer

stations, stables, motor vehicle repair shops, manufacturing rooms for unfinished products, hangars.

– Climate class 13

Rooms in buildings without significant thermal insulation and with low thermal capacity, neither heated or cooled, e.g. telephone booths, entrances of buildings, barns, lofts, unheated store rooms, sheds, garages.

• Ambient conditions

– Natural pollutants

– Chemically active pollutions

– Small animals.

影响开关装置的 室内气候 Room climate ¹⁾ affecting the switchgear	环境 温度 Ambient temper- ature	相对 湿度 Relative humid- ity	凝露 Condensation	特殊的环境条件 Special ambient conditions	所需辅助措施 Additional measures needed
气候类型 11 Climate class 11	+5- +40°C	5- 85%	无 none	无 none	
气候类型 12 Climate class 12	+25- +55°C	10- 100%	偶然一月 2小时 灰尘 dust for two hours	无 none	有 yes
				沙尘 blown sand	有 yes
				有 yes	
气候类型 13 Climate class 13	+25- +70°C	10- 100%	经常一天 2小时 灰尘 dust frequently once a day for two hours	无 none	有 yes
				沙尘 blown sand	有 yes
				有 yes	
				小动物 small animals	有 yes
				无 none	有 yes
				沙尘 blown sand	有 yes
				有 yes	
				小动物 small animals	有 yes
				天花板滴水 (无垢) 按照 DIN 40050/IEC529 Dripping water DIN 40050 and IEC publ.529	有 yes

有化学污 染的区域 Areas subject to chemical pollution	二氧化硫 Sulphur dioxide(SO ₂) > 2ppm	有 yes
	硫化氢 Hydrogen sulphide(H ₂ S) > 1ppm	有 yes
	盐酸 Hydrochloric acid(HCl) > 3ppm	有 yes
	氨气 Ammonia(NH ₃) > 15ppm	有 yes
	氯化物 沉积的氯化物 (盐雾) > 2mg/dm ² Chloride deposit (Cl ⁻) (Saline fog) > 2mg/dm ²	有 yes
	沉积的氯化物	有 yes

1) 根据 IEC 72-3-3 号出版物和西门
子标准 29070 第一部分

1) Based on IEC Publication 72-3-3
and Siemens standard SN 29070
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